Uterine synechiae after bipolar hysteroscopic resection of submucosal myomas in patients with infertility

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Objective: To determine the rate of uterine synechiae after bipolar hysteroscopic myomectomy in patients suffering from infertility.
Design: Retrospective case series study.
Setting: University obstetrics gynecologic and assisted reproduction center.
Patient(s): A group of 53 patients with primary (n = 30) and secondary (n = 23) infertility.
Intervention(s): Patients underwent bipolar hysteroscopic resection of myomas between 2001 and 2006, and an outpatient hysteroscopy was performed 2 months after the fibroid resection.
Main Outcome Measure(s): The formation of uterine synechiae and pregnancy rates were collected from the patients' clinical notes.
Result(s): The submucosal myomas were intracavitary class 0 (n = 12), intramural class 1 (n = 19), and intramural class 2 (n = 22). The mean age of the women was 35.0 ± 4.8 years. The mean myoma size was 25 ± 11 mm. Postoperative office hysteroscopies revealed synechiae in four (7.5%) of 53 patients. Sixteen (32.7%) of the 49 patients not lost to follow-up conceived, and 12 (24.5%) of them delivered at term. Myoma size ≥3.5 cm and age <35 years were associated with a significantly higher pregnancy rate in univariate and multivariate analysis.
Conclusion(s): The incidence of uterine synechiae after bipolar hysteroscopic resection of fibroids was 7.5%. This appears to be lower than that reported in previous studies using monopolar energy. Bipolar hysteroscopic myomectomy may be a better option for infertile women. (Fertil Steril® 2008;■:■–■. ©2008 by American Society for Reproductive Medicine.)

Key Words: Bipolar electrosurgery, myomectomy, hysteroscopy, infertility, uterine synechia, submucosal myoma

Many factors contribute to infertility and recurrent pregnancy loss, one of the more common being uterine cavity-filling defects, such as fibroids. Myomas, present in 20%–25% of women aged >35 years, are the most common solid pelvic tumors in women. The incidence of submucosal myomas associated with infertility has traditionally been reported to range from 5% to 10% (1–3). The mechanism by which submucosal myomas contribute to infertility and pregnancy loss is uncertain. It has been postulated that they interfere with the vascular supply to the trophoblastic tissue of an implanting embryo (4). They are an increasing medical problem as more and more women attempt to conceive at a more advanced age, when the prevalence of these lesions also increases.

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Leiomyomas associated with infertility have long been treated by abdominal myomectomy, and studies show pregnancy rates greater than 50% after surgery (5). With the advent of operative hysteroscopy, intracavitary myomas can be removed without laparotomy. The advantages of hysteroscopic myomectomy include shorter duration of hospitalization, lower costs, reduced pain and recovery time, and elimination of the risk of pelvic adhesions that often accompany abdominal myomectomy (6). Several retrospective studies have reported successful reproductive outcomes after monopolar hysteroscopic removal of submucosal myomas in infertile women (7–11). Of these, few report the incidence of postoperative intrauterine adhesions after the procedure.

Hysteroscopic techniques and instrumentation have advanced substantially in the past decade. In particular, bipolar energy can now be used for hysteroscopic resection. This means that normal saline can be used to distend the uterus and reduce the risk of hyponatremia associated with the use of glycine and monopolar resection. Hysteroscopic myomectomy carries the risk of scarring the uterine cavity at the site of resection, with uterine adhesions forming postoperatively. One study reported a prevalence of postoperative uterine adhesions of around 30% (12). Adhesions may affect menstruation, with hypomenorrhea and amenorrhea in severe cases,

resulting in infertility and pregnancy disorders, such as recurrent pregnancy loss, placenta accreta, and intrauterine growth restriction. The objective of our study was to evaluate the incidence of postoperative uterine adhesions after bipolar hysteroscopic myomectomy.

MATERIALS AND METHODS

The study population included 53 patients who had been attempting to conceive for more than 2 years before hysteroscopic resection of their submucosal myomas. Institutional Review Board (the French Research Ethics Committee) approval was obtained for the study. We sent information letters to the patients whose data were used for this article and offered them the possibility of refusing to have their data included.

Preoperative office diagnostic hysteroscopy or pelvic transvaginal ultrasound or both was performed in all cases to determine the size, number, and precise site of submucosal myomas. Ultrasound evaluation showed a distance greater than 5 mm between the serosa and the myoma in all cases. The submucosal myomas were intracavitary class 0 (n = 12), intramural class 1 with the largest diameter in the cavity (n = 19), and intramural class 2 (n = 22), according to the European Society of Gynecologic Endoscopy classification (11, 13). None of these patients were diagnosed with intrauterine adhesions preoperatively. All subjects also had a routine infertility evaluation including at least serum FSH, LH, E_2, and ultrasound on the third day of the cycle, hysterosalpingography, and analysis of their partner's semen.

Preoperative medical treatment was not used. All 53 women underwent myomectomy by operative hysteroscopy under general anesthesia during the first part of their cycle. Resection was performed with a rigid 24-Fr resectoscope with a coaxial bipolar electrode (VersaPoint, Gynecare Inc., Somerville, NJ) in 46 patients whose myoma diameter was >1.5 cm. For myomas with a diameter <1.5 cm, we used a flexible bipolar electrode that was 1.6 mm in diameter (5 Fr) and 36 cm long (n = 7). The uterine cavity was distended with normal saline solution and flushed at a flow rate of 250 mL/minute and a pressure of 80–100 mmHg, with a vacuum of −30 to −40 mmHg applied for suction. Fluid balance was recorded by measuring the infused and drained fluid from the continuous flow resectoscope and taking into account the fluid lost during the removal of the hysteroscope to collect the resected pieces of tumor from the operative field into a calibrated pouch. Neither fluid overload (more than 1000 mL) nor electrolyte imbalance was observed in any patient.

Antibiotic prophylaxis (one injection of 2 g amoxicillin + clavulanic acid) was administered preoperatively to all patients.

An outpatient hysteroscopy, which is standard in our department after hysteroscopic surgery for infertility, was routinely performed 2 months after myomectomy to diagnose postoperative uterine synechiae and assess the adhesion score according to the American Fertility Society recommendations. When identified, a 30° forward-oblique telescope was used to lyse them during the same procedure. For those with any residual myoma, a second (n = 10) and sometimes a third (n = 2) operative hysteroscopy were recommended (n = 12). Each was followed by a postoperative diagnostic hysteroscopy 2 months later.

Statistical analysis was performed with the χ^2-test, Wilcoxon test, or Fisher's exact test when appropriate and a multiple logistic regression. Statistical analyses were carried out using StatView software, version 5.0 (SAS Institute, Cary, NC).

RESULTS

The results of office hysteroscopy 2 months after surgery were available for all 53 women. Median follow-up of 39 ± 17.8 months (range, 10–72 months) was available for 49 patients; four patients were lost to follow-up. The median age of the 53 patients was 35 ± 4.2 years (range, 26–43 years). Thirty (56.6%) had primary infertility, with an average duration of 49.6 ± 38.2 months (range, 24–240 months). Twenty-three (43.4%) had secondary infertility, including one (1.9%) primiparous, seven (13.2%) multiparous, 10 (18.9%) with previous miscarriage, two (3.8%) with previous ectopic pregnancy, and three (5.6%) with prior voluntary termination of pregnancy.

The duration of the procedure was 36 ± 19 minutes (range, 17–69 minutes), which was measured from the beginning of the cervical dilatation to the completion of resection. No intraoperative complications were observed. The immediate postoperative course was uneventful, and all patients were discharged within 10 hours.

The mean diameter of the myomas removed was 25 ± 11 mm (range, 7–50 mm). Resection was complete in 40 cases (75.5%) and incomplete in 12. The latter required a second procedure 3 months later because of size (n = 7) or intramural class (n = 5).

Four synechiae (7.5%), all rated class 1 according to the American Fertility Society adhesion score, were diagnosed during the routine office hysteroscopy conducted 2 months postoperatively. All were treated successfully during the procedure. None of the two patients who underwent a third intervention had synechia at each control hysteroscopy. One of the 10 patients who underwent a second surgery had a synechia diagnosed at control hysteroscopy, but it was after the first resection only. The overall pregnancy rate was 32.7% (16/49). The median time from surgery to conception was 12.5 ± 7.6 months (range, 4–31 months). Eight of the 16 patients underwent active fertility treatments such as stimulation or IVF. Eight conceived spontaneously, and 12 delivered at term; two had spontaneous abortions, one gave birth at 35 weeks to a premature but healthy baby, and one had her pregnancy terminated after diagnosis of Down syndrome. No deliveries

TABLE 1

Characteristics and fertility of patients according to the presence of synechiae.

	n	Age (years) median ± SD	Myoma size (cm) median ± SD	No. of pregnant patients (%)	No. of miscarriages (%)	No. of live births (%)	No. of patients lost to follow-up
Patients with synechiae	4	32.5 ± 3.6	3.8 ± 1.4[a]	3 (75.0)[b]	1 (33.3)[c]	2 (66.6)[d]	0 (0)
Patients with no synechiae	49	35.0 ± 4.0	2.5 ± 1.1[a]	13 (29.5)[b]	1 (7.7)[c]	11 (84.6)[d]	4 (8.2)
Total	53	35.0 ± 4.1	2.5 ± 1.1	16 (33.3)	2 (12.5)	13 (81.2)	4 (7.5)

[a] $P = .36$.
[b] $P = .07$.
[c] $P = .35$.
[d] $P = .48$.

Touboul. Bipolar hysteroscopic myomectomy. Fertil Steril 2008.

were complicated by placenta previa or accreta or by postpartum hemorrhage.

Three (75%) of the four patients with lysed postmyomectomy adhesions subsequently conceived. Two had live births, one of them premature. The third had primary infertility, and she had two consecutive miscarriages 19 and 31 months after hysteroscopic resection and no live birth. Table 1 summarizes the characteristics of these four patients with postmyomectomy adhesions. The myomas in these patients were all intramural class 1 (n = 2) or 2 (n = 2). The pregnancy rate was significantly higher in patients with myomas ≥3.5 cm (Table 2). The pregnancy rate and live birth rate were significantly higher in patients who were <35 years (Table 3). We carried out a multiple logistic regression including the age of the patients and the diameter of myomas. The analysis confirmed that fertility rate was higher in patients with larger -diameter myomas ($P = .04$) and in younger women ($P = .002$).

DISCUSSION

We report here a uterine synechiae rate of 7.5% after bipolar hysteroscopic myomectomy in 49 infertile patients. The pregnancy rate was 32.7%, with a median time from surgery to conception of 12.5 months.

In a prospective study, Taskin et al. (12) reported a synechiae rate after monopolar hysteroscopic myomectomy of 31.3% for solitary fibroids and 45.5% for multiple myomas but did not report the fertility rate. These rates are more than 3 times higher than the rate we found after bipolar resection. This difference may be explained by the selective resection made possible by using bipolar energy. This system does not require dispersive return electrodes and does not generate stray currents; it thus minimizes the risk of electrical burns and intrauterine adhesions that may occur after trauma to the endometrial basalis. Moreover, unselective lesions of neighboring tissues may follow resection with monopolar energy and may delay scar formation. Nevertheless, Guida et al. (14) reported a synechiae rate of 26.1% after bipolar hysteroscopic resection of 65 myomas, polyps, and septas. The aim of that study was to evaluate the efficacy of a hyaluronic acid gel in the prevention of intrauterine adhesions. Twenty-four patients had hysteroscopic myomectomy with a 33.3% postoperative synechiae rate. No information concerning myoma size and type was available in that study. Guida et al. also reported more than 18% and 37% synechiae in patients with polyps and septa, respectively, which is very high. In comparison, Taskin et al. (12) using monopolar energy reported synechiae in only one patient with septa of a group of patients treated for polyps (n = 28) and uterine septa (n = 15).

The report of the associated fertility rates shows the real impact of myomectomy and synechiae in fertility. When synechiae are diagnosed and treated during postoperative hysteroscopy, pregnancy remains possible. Patients with postoperative adhesions were younger, and their myomas were larger, although these differences compared with patients without synechiae were not significant (Table 1). We note, however, that the size of this population was too small to show any significant difference. In any case, age and myoma size were good prognostic factors for fertility after

TABLE 2

Impact of myoma size on fertility.

Myoma size, cm	No. of cases	No. of pregnant patients (%)
<3.5	33	6 (18.2)[a]
≥3.5	16	10 (62.5)[a]

[a] $P = .005$.

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TABLE 3

Impact of age on fertility.

Age, years	No. of cases	No. of pregnant patients (%)	No deliveries (%)
<35	20	12 (60.0)[a]	11 (91.1)[b]
≥35	29	4 (12.8)[a]	2 (50.0)[b]

[a] $P = .02$.
[b] $P = .01$.

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treatment in our study (Tables 2 and 3). The fertility rate was significantly higher when the diameter of the myoma was ≥3.5 cm. Our results are consistent with those of Fernandez et al. and Vercellini et al., who reported a significantly higher pregnancy rate when myomas were >3 cm and >5 cm, respectively (7, 8). These observations reinforce the hypothesis that myomas may be a cause of infertility. The number of myomas is also an important prognostic factor for fertility (15–17). In our study, the patient with primary infertility and recurrent miscarriages after the resection had four myomas resected. These miscarriages may be due to the synechiae complicating the resection. Another explanation is that the risk of residual myomas increases with the number of myomas removed because their complete excision is difficult (17, 18). Another prognostic factor in the current study is the patient's age. Both the pregnancy and live-birth rates were significantly higher in patients <35 years old, as previously reported by Fernandez et al. (15). This observation may also explain the high pregnancy rate in the patients with synechiae in our study, whose median age was <35 years old.

Over the past two decades, several methods have been proposed to reduce the rate of postoperative synechiae. The use of intrauterine contraceptive devices or bladder catheters seems to be effective in preventing intrauterine synechiae (19). Taskin et al. conducted a prospective trial of treatment with danazol to prevent them and found that it was not effective (12). Only auto-cross-linked hyaluronic acid gel appeared effective in the prevention of intrauterine adhesions after hysteroscopic surgery (14) and after hysteroscopic adhesiolysis (20). It also reduced the severity of postoperative adhesions. However, none of these studies evaluated fertility after the use of these gels, and no data are available about their effects on implantation. In contrast, hysteroscopic myomectomy with bipolar energy requires only saline serum, which has no negative effect on implantation.

In conclusion, the incidence of uterine synechiae after bipolar hysteroscopic resection of myomas appears to be lower than reported in previous studies using monopolar energy and is thus a better option for infertile women. A randomized prospective study comparing postoperative intrauterine synechiae after bipolar and monopolar hysteroscopic myomectomy is now required to confirm this observation.

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