

# Evaluation of the Efficacy and Effectiveness of Hysteroscopic Electroresection in the Treatment of Submucosal Uterine Fibroids

Guangli Sun\*

Gaoyou People's Hospital, Yangzhou 225600, Jiangsu Province, China

\*Corresponding author: Guangli Sun, 18921923179@163.com

**Copyright:** © 2024 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** *Objective:* To evaluate the effect of hysteroscopic electroresection in treating submucosal uterine fibroids. *Methods:* Using the random number table method, 70 patients with submucosal uterine fibroids were divided into two groups, 35 cases/group. The control group underwent laparoscopic myomectomy, and the observation group underwent hysteroscopic electroresection. Surgical indicators, sex hormone indicators, inflammation indicators, and treatment effects were compared between the two groups. *Results:* The surgical indicators, sex hormone indicators, and inflammatory indicators three months after operation in the observation group were all more ideal than those of the control group. The total effective rate of the observation group (97.14%) was higher than that of the control group ( $P < 0.05$ ). *Conclusion:* Hysteroscopic electroresection for the treatment of submucosal uterine fibroids was less invasive, accelerates recovery, and is more effective.

**Keywords:** Submucosal uterine fibroids; Hysteroscopic electroresection; Treatment effect

**Online publication:** March 24, 2024

## 1. Introduction

The occurrence of fibroids under the uterine mucosa can cause a variety of adverse symptoms, such as abdominal distension, frequent urination, irregular menstruation, etc., and can even lead to anemia. Protruding fibroids can occupy the uterine cavity, expand the endometrial area, cause abnormal uterine contraction, and impact the menstrual cycle <sup>[1]</sup>. Traditional surgical treatment for fibroids is invasive, causes scarring, and has a relatively high recurrence rate. Hysteroscopy technology has developed rapidly in recent years and has gained several advantages in treating gynecological diseases. Hysteroscopy surgery allows for observation of the location, size, and even the blood supply of the fibroid <sup>[2]</sup>. The treatment process will not cause excessive bleeding and has a better prognosis for recovery. It is currently a more effective way to treat submucosal uterine fibroids. This study analyzed the effectiveness of hysteroscopic electroresection in treating submucosal uterine fibroids. 70 patients were included and divided into two groups for comparative analysis.

## 2. Materials and methods

### 2.1. Information

In this study, 70 patients with submucosal uterine fibroids were selected (admission time: January 2021 to January 2023) and divided into two groups using the random number table method, with 35 patients in each group. The control group consisted of patients aged 23–40 with an average age of  $31.52 \pm 4.18$  years. The duration of the disease was 4 months to 2 years with an average duration of  $1.13 \pm 0.10$  years. The fibroid diameter was 2–5 cm with an average diameter of  $3.21 \pm 0.40$  cm. The observation group consisted of patients aged 21–41 with an average age of  $31.40 \pm 4.24$  years. The duration of the disease was 5 months to 2 years with an average duration of  $1.19 \pm 0.12$  years. The fibroid diameter was 2–5 cm with an average diameter of  $3.13 \pm 0.36$  cm. Statistical analysis was performed on the two data groups and the results were not significant ( $P > 0.05$ ).

Inclusion criteria: (1) Patients who meet the diagnostic criteria for submucosal uterine fibroids; (2) patients with related symptoms such as waist pain, lower abdominal distension, and menstrual disorders; (3) patients who can communicate properly (4) no other serious gynecological diseases; (5) patients with complete clinical data.

Exclusion criteria: (1) Patients with other serious diseases, such as organ lesions, malignant tumors, etc.; (2) patients who have used hormonal drugs in the past three months; (3) patients with limited expansion of uterine scars or adverse conditions such as uterine hyperflexion; (4) patients who refuse to follow-up after surgery.

### 2.2. Method

The control group underwent laparoscopic myomectomy. Subjects were first anesthetized and the abdominal cavity was punctured to establish an artificial pneumoperitoneum. The pressure was controlled between 12–14 mmHg and the laparoscope was inserted into the puncture hole at the upper edge of the umbilicus. Three other puncture holes were made and other surgical instruments were inserted. A diluted pituitrin injection of 6  $\mu$ g was administered into the muscle wall intravenously. The tumor and its surrounding areas were inspected. The muscle layer on the surface of the tumor was incised and separated using large grasping forceps. Once the tumor was removed, the skin was sutured layer by layer. The abdominal cavity was flushed and the surgical instruments were removed. Any remaining carbon dioxide was drained, the skin was sutured, and targeted treatment was performed after surgery.

The observation group underwent hysteroscopic electroresection. Upon administration of anesthesia, the perineum was disinfected, and the patient was placed in a lithotomy position. The cervix was then dilated to expose the fibroids. A hysteroscope was inserted to observe the size and location of the fibroids. Subsequently, a ring electrode was used to approach the junction between the tumor body and the uterine wall. The uterus was then cut, and the fibroid capsule was opened. Oval forceps were used to clamp the small piece of the tumor and the false pedicle at the bottom of the tumor. The entire tumor was then cut off and removed. After flushing, the affected area was observed to ensure no residual tissue remained. For pedunculated fibroids, the tumor pedicle was cut off under hysteroscopy. The tumor was then removed through the cervix, and electrocoagulation was used to stop any bleeding. After surgery, targeted treatment was provided.

### 2.3. Observation indicators

The surgery-related indicators between the two groups, including intraoperative blood loss, operation time, and postoperative exhaust time were compared. Sex hormone indicators between the two groups were also compared. On the third to fifth day of the menstrual cycle, 3 mL of fasting cubital venous blood was collected to detect progesterone (P), estradiol (E2), follicle-stimulating hormone (FSH), and luteinizing hormone (LH). Detection was carried out using the radioimmunoassay double antibody method, before and three months after

surgery. Inflammatory indicators including tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), C-reactive protein (CRP), and interleukin-6 (IL-6) were compared between the two groups. Detection was carried out using enzyme-linked immunosorbent assay, before and three months after surgery. Lastly, the treatment effects of the two groups were compared. The treatment was judged as “significantly effective” once the menstrual cycle returned to normal, with the disappearance of abdominal pain, fibroids, and no formation of new fibroids. The treatment was judged as “effective” once the menstrual cycle returned to normal, symptoms were relieved and the fibroid volume was reduced by 80% or more. The treatment was judged as “ineffective” if it failed to meet the above standards. The total effective rate was calculated by adding up “significantly effective” rates and “effective” rates [3].

## 2.4. Statistical methods

The SPSS 25.0 was used for statistical analysis. Measurement data were expressed as mean  $\pm$  standard deviation and count data were expressed as [ $n$  (%)]. Data between the two groups were compared and analyzed using a  $t$ -test and chi-square ( $\chi^2$ ) test. Results were considered statistically significant at  $P < 0.05$ .

## 3. Results

### 3.1. Surgery-related indicators

As shown in **Table 1**, the observation group had less intraoperative blood loss, shorter operation time, and shorter postoperative exhaust time as compared to that of the control group ( $P < 0.05$ ).

**Table 1.** Surgery-related indicators (mean  $\pm$  standard deviation)

Group	Cases, $n$	Intraoperative blood loss (mL)	Operation time (min)	Postoperative exhaust time (h)
Control group	35	30.63 $\pm$ 4.16	40.25 $\pm$ 4.23	15.10 $\pm$ 2.28
Observation group	35	26.27 $\pm$ 3.35	37.14 $\pm$ 3.16	12.24 $\pm$ 2.15
$t$	-	4.829	3.485	5.399
$P$	-	0.000	0.001	0.000

### 3.2. Sex hormone indicators

As shown in **Table 2**, there was no significant difference in the sex hormone indicators between the two groups before surgery ( $P > 0.05$ ). Three months after surgery, the levels of sex hormone indicators in the observation group were better than those in the control group ( $P < 0.05$ ).

**Table 2.** Sex hormone indicators (mean  $\pm$  standard deviation)

Group	Cases, $n$	P ( $\mu\text{g/L}$ )		E2 (ng/L)		FSH (IU/L)		LH (IU/L)	
		Before surgery	Three months after surgery	Before surgery	Three months after surgery	Before surgery	Three months after surgery	Before surgery	Three months after surgery
Control group	35	30.23 $\pm$ 3.16	33.14 $\pm$ 3.15	81.52 $\pm$ 5.19	68.14 $\pm$ 3.36	9.21 $\pm$ 1.13	10.24 $\pm$ 1.37	7.20 $\pm$ 1.15	8.31 $\pm$ 1.28
Observation group	35	30.19 $\pm$ 3.24	35.81 $\pm$ 3.33	81.47 $\pm$ 5.24	62.30 $\pm$ 3.18	9.15 $\pm$ 1.20	11.30 $\pm$ 1.54	7.29 $\pm$ 1.10	9.08 $\pm$ 1.21
$t$	-	0.052	3.446	0.040	7.468	0.215	3.042	0.335	2.586
$P$	-	0.958	0.001	0.968	0.000	0.830	0.003	0.739	0.012

### 3.3. Inflammation indicators

As shown in **Table 3**, there was no significant difference in the inflammatory indicators between the two groups before surgery ( $P > 0.05$ ). Three months after surgery, the levels of various inflammatory indicators in the observation group were lower than that of the control group ( $P < 0.05$ ).

**Table 3.** Inflammation indicators (mean  $\pm$  standard deviation)

Group	Cases, <i>n</i>	TNF- $\alpha$ ( $\mu\text{g/L}$ )		CRP (mg/L)		IL-6 (ng/L)	
		Before surgery	Three months after surgery	Before surgery	Three months after surgery	Before surgery	Three months after surgery
Control group	35	0.83 $\pm$ 0.14	2.13 $\pm$ 0.25	4.22 $\pm$ 0.41	7.49 $\pm$ 1.12	4.85 $\pm$ 0.61	8.51 $\pm$ 0.84
Observation group	35	0.85 $\pm$ 0.11	1.90 $\pm$ 0.13	4.25 $\pm$ 0.38	6.51 $\pm$ 0.59	4.81 $\pm$ 0.56	7.79 $\pm$ 0.31
<i>t</i>	-	0.665	4.829	0.317	4.580	0.286	4.757
<i>P</i>	-	0.509	0.000	0.752	0.000	0.776	0.000

### 3.4. Treatment effect

As shown in **Table 4**, the total effective rate of treatment of the observation group was higher than that of the control group ( $P < 0.05$ ).

**Table 4.** Treatment effect [*n* (%)]

Group	Cases, <i>n</i>	Significantly effective	Effective	Ineffective	Total effective rate
Control group	35	19 (54.29)	10 (28.57)	6 (17.14)	29 (82.86)
Observation group	35	25 (71.43)	9 (25.71)	1 (2.86)	34 (97.14)
$\chi^2$	-	-	-	-	3.968
<i>P</i>	-	-	-	-	0.046

## 4. Discussion

Uterine fibroids are benign tumors that form due to the proliferation of uterine smooth muscle tissue. Most uterine fibroids are discovered during physical examination. It is more common among middle-aged women and is associated with clinical symptoms such as menstrual disorders and abdominal discomfort. The causes are complex and often related to abnormal sex hormone levels, stem cell dysfunction, genetic inheritance, etc. [4,5]. Recently, the detection rate of uterine fibroids has increased due to the increase in the self-examination rate. Uterine fibroids can occur under the submucosal, subserosal, or intramuscular walls where submucosal uterine fibroids account for about 10%–15% [6]. The fibroids grow into the uterus and protrude into the uterine cavity, and the mucosa covers the surface of the fibroids, resulting in abnormal uterine contraction. The fibroids may also enter the vagina from the cervix. If not treated promptly, it may cause infertility and fatality [7].

Recently, laparoscopic technology has developed rapidly and has been widely used in major surgical procedures. Laparoscopic myomectomy for submucosal fibroids can maintain the integrity of the abdominal wall, prevent contamination of the pelvic environment, and is safe. Although it is minimally invasive, this surgery requires a relatively high number of sutures [8,9]. During the operation, puncturing from the abdomen may cause damage to surrounding tissues, the uterus, and the pelvic cavity. In addition, larger fibroids require longer operation times and are associated with increased bleeding. Hysteroscopic electroresection of uterine fibroids is also a minimally invasive surgery that can preserve the integrity of the serosa layer and prevent

pelvic adhesions<sup>[10]</sup>. In addition, hysteroscopic surgery is performed through the vagina and is inserted by dilating the cervix. Laparoscopic surgery and removal of diseased tissue is simpler, has a shorter operation time, lesser amount of blood loss, and does not result in abdominal wall incisions. Hence, this method is more in line with the patient's aesthetic needs.

The results showed that patients in the observation group had less intraoperative bleeding, shorter operation time, and shorter postoperative exhaust time, which may be related to the fact that hysteroscopic electroresection does not require abdominal wall and uterine incisions and other invasive operations. When comparing the postoperative sex hormone and inflammation indicators between the two groups, the levels in the observation group were more ideal. The reason is that most fibroids expand in the myometrium. If there is great trauma caused by the operation, the ovarian artery and ovarian artery will likely be further damaged. The ovarian branch of the uterine artery reduces blood supply and affects ovarian hormone levels. The secretion of sex hormones is related to the blood supply and blood sample conditions of the ovarian artery and ovarian branch of the uterine artery<sup>[11,12]</sup>. If surgery results in reduced blood supply, it will directly impact ovarian hormone levels. The operating scope of hysteroscopic electroresection is concentrated on the superficial myometrium. As compared with laparoscopic electroresection, it has less impact on the blood flow of the uterine artery and the development of follicles, hence maintaining sex hormone levels and ovarian function is maintained<sup>[13]</sup>. Data has shown that hysteroscopic electroresection is more beneficial to the recovery of ovarian function and causes less damage to the body. When comparing the total effective rate of treatment between the two groups, the observation group was 97.14%, and the control group was 82.86%, further proving that hysteroscopic electroresection is more effective in treating submucosal uterine fibroids. Hysteroscopic surgery is simple to operate, less invasive, and does not damage the uterus. It also ensures body integrity and reproductive function. Another study found that hysteroscopic electroresection causes less pain<sup>[14]</sup>.

## 5. Conclusion

As compared to the laparoscopic removal of submucosal uterine fibroids, hysteroscopic electroresection was more effective in maintaining the surgical indicators, sex hormone indicators, and inflammatory indicators, and has better treatment effects.

## Disclosure statement

The author declares no conflict of interest.

## References

- [1] Guo Y, Liu L, Li J, et al., 2020, Comparison of the Efficacy of Hysteroscopic Electroresection and Laparoscopic Myomectomy in the Treatment of Patients with Submucosal Uterine Fibroids and Infertility. *Inner Mongolia Medical Journal*, 52(3): 267–269.
- [2] Chen C, 2020, Clinical Effect of Hysteroscopic Uterine Fibroid Electroresection in Treating Submucosal Fibroids. *Chinese Contemporary Medicine*, 27(17): 118–121.
- [3] Peng F, Ke Y, Shen L, et al., 2020, The Application Value of Hysteroscopic Electroresection in the Treatment of Submucosal Uterine Fibroids. *Jilin Medicine*, 41(3): 663–664.
- [4] Bing X, 2020, Analysis of the Clinical Efficacy and Prognosis of Hysteroscopic Electroresection in the Treatment of Submucosal Uterine Fibroids. *Chinese Modern Drug Application*, 14(19): 92–94.

- [5] Lu D, 2020, Analysis of the Efficacy and Safety of Ultrasound-Guided Hysteroscopic Electroresection in Treating Submucosal Uterine Fibroids. *Capital Food and Medicine*, 27(17): 28.
- [6] Sun D, 2023, Observation on the Efficacy of Hysteroscopic Electroresection in the Treatment of Submucosal Uterine Fibroids. *Chinese Modern Drug Application*, 17(4): 68–70.
- [7] Feng Y, 2023, Discussion on the Efficacy of Hysteroscopic Uterine Fibroid Electroresection in Patients with Uterine Submucosal Fibroids and its Impact on Ovarian Reserve Function. *Chinese Practical Medicine*, 18(14): 52–54.
- [8] Sheng L, 2022, Effect of Hysteroscopic Electroresection Under Ultrasound Supervision in the Treatment of Patients with Submucosal Uterine Fibroids. *Chinese Journal of Civil Health*, 34(7): 25–27.
- [9] Zhang C, Yang Y, 2022, The Effect of Hysteroscopic Uterine Fibroid Electroresection in Treating Uterine Submucosal Fibroids and its Impact on Patients' Ovarian Reserve Function. *Clinical Medical Research and Practice*, 7(22): 88–90.
- [10] Wang L, Liu R, 2021, Efficacy of Hysteroscopic Electroresection in the Treatment of Submucosal Uterine Fibroids and Perioperative Blood Flow Changes. *Thrombosis and Hemostasis*, 27(5): 835–836.
- [11] Zhao Y, 2021, Analysis of the Efficacy and Safety of Hysteroscopic Electroresection Under Ultrasound Surveillance in Treating Submucosal Uterine Fibroids. *Henan Medical Research*, 2021, 30(25): 4721–4723.
- [12] Zhang H, 2023, Effects of Hysteroscopic Submucosal Uterine Fibroids and Polyps Electroresection on Reproductive Prognosis and Ovarian Function Recovery in Patients with Submucosal Uterine Fibroids. *Marriage, Childbirth and Health*, 29(8): 16–18.
- [13] Zhang F, 2022, The Efficacy of Hysteroscopic Uterine Fibroid Electroresection in Treating Uterine Submucosal Fibroids. *Journal of Shanxi Health Vocational College*, 2022, 32(4): 22–24.
- [14] Zhang L, Luo S, 2022, Clinical Effect of Hysteroscopic Electroresection in the Treatment of Submucosal Uterine Fibroids and Its Impact on Patients' Sex Hormone Levels and Ovarian Reserve Function. *Clinical Medical Research and Practice*, 7(21): 94–97.

**Publisher's note**

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.