

Original Research Article

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Analysis of 269 Cases of Uterus-Preserving U-Surgery for Diffuse Adenomyosis in Patients Outside Chinese Mainland

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Abstract: Objective: To analyze the clinical data of 269 patients with diffuse adenomyosis outside Chinese Mainland who underwent uterus-preserving U-surgery from 2006 to 2025, evaluate the safety, symptom improvement effect and long-term recurrence rate of the surgical procedure, and explore its international clinical application value. **Methods:** The clinical data of 269 patients with diffuse adenomyosis from 22 countries worldwide were collected retrospectively. The age, disease course, previous treatment history, surgery-related indicators, postoperative visual analog scale (VAS) score for dysmenorrhea, menstrual volume changes and recurrence were statistically analyzed using SPSS 26.0. **Results:** The patients were aged 22 to 53 years, with a mean age of (37.5±6.2) years; the disease course was 3 to 22 years, with a mean of (8.6±3.5) years. A total of 222 cases (82.5%) had received conservative treatments such as GnRH-a and progestogens, and 33 cases (12.3%) had a history of recurrence after focal resection. The operation time was 58 to 196 minutes, with a mean of (102.5±28.6) minutes; the intraoperative blood loss was 200 to 500 ml, with a mean of (320.5±85.2) ml, and all incisions achieved primary healing. The mean preoperative VAS score for dysmenorrhea was 8.6 points, which decreased to 1.5 points after surgery, with a highly statistically significant difference ($P < 0.001$). The menstrual volume of all patients was significantly reduced after surgery, and 92.2% of them returned to normal. All 269 patients were followed up for 6 to 240 months, with only 1 case of recurrence, resulting in a recurrence rate of 0.3%. **Conclusion:** Uterus-preserving U-surgery has high safety in the treatment of diffuse adenomyosis in patients outside Chinese Mainland, which can significantly relieve dysmenorrhea and reduce menstrual volume with an extremely low long-term recurrence rate. It is suitable for patients with diffuse adenomyosis who have the demand for uterus preservation worldwide.

Keywords: Diffuse adenomyosis; Uterus-preserving U-surgery; Uterus preservation; Dysmenorrhea; Recurrence rate; International patients



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1. Introduction

Adenomyosis is a common benign gynecological disease in women of childbearing age. Diffuse lesions have become a clinical treatment challenge due to extensive infiltration into the uterine myometrium without clear boundaries^[1]. Its core symptoms are progressively worsening dysmenorrhea and menorrhagia, which seriously affect patients' quality of life, and some patients are also accompanied by uterine enlargement and infertility^[2]. Current clinical treatments mainly include medication, minimally invasive interventional therapy and surgery: drugs such as GnRH-a and progestogens can only relieve symptoms in the short term, with a recurrence rate of more than 80% after drug withdrawal, and long-term use is prone to side effects such as osteoporosis^[3]; minimally invasive interventional therapies such as radiofrequency ablation and high-intensity focused ultrasound cannot completely remove diffuse lesions, leading to limited long-term efficacy^[4]; although total hysterectomy can achieve radical cure, it results in permanent loss of the uterus, which violates the fertility wishes of most women of childbearing age and may also cause complications such as pelvic floor dysfunction^[5].

Uterus-preserving U-surgery, pioneered by Professor Wang Bin, is a new type of uterus-preserving focal resection for diffuse adenomyosis. It accurately removes diffuse lesions and reconstructs uterine morphology through a unique U-shaped approach, achieving the dual goals of "uterus preservation + radical cure"^[6]. Over the 20 years from 2006 to 2025, our center has performed this surgery for a total of 269 patients with diffuse adenomyosis from 22 countries including the United States, Canada, the United Kingdom and Japan, achieving remarkable curative effects. This study provides evidence-based medical evidence for the international clinical application of uterus-preserving U-surgery and a new solution for the global treatment of diffuse adenomyosis by retrospectively analyzing the complete clinical data of this group of patients.

2. Materials and Methods

2.1 Study Subjects

A total of 269 patients with diffuse adenomyosis outside Chinese Mainland who underwent uterus-

preserving U-surgery in our center from January 2006 to December 2025 were retrospectively selected, and the patients were from 22 countries in Asia, Europe, the Americas, Oceania and the Middle East.

Inclusion criteria: ① Confirmed diagnosis of diffuse adenomyosis by pelvic ultrasound, MRI combined with postoperative pathology; ② Moderate to severe dysmenorrhea (VAS ≥ 6 points) and/or menorrhagia affecting normal life; ③ Clear willingness for uterus preservation; ④ Complete clinical, surgical and follow-up data.

Exclusion criteria: ① Complicated with other gynecological diseases such as uterine fibroids with diameter ≥ 5 cm and endometrial cancer; ② Complicated with severe heart, liver, kidney and coagulation dysfunction and unable to tolerate surgery; ③ Pregnant or lactating women; ④ Missing follow-up data.

2.2 Surgical Method

All patients underwent the U-shaped uterine focal resection invented by Professor Wang Bin performed by a professional gynecological team with open surgery under general anesthesia. The standardized steps were as follows: ① A median or transverse lower abdominal incision was made, and the abdominal cavity was entered layer by layer to expose the uterus and adnexa; ② A tourniquet was placed at the uterine isthmus to block the blood flow of the uterine artery and reduce bleeding; ③ A U-shaped incision was made along the myometrium of the uterine body to the deep layer of lesion infiltration, and all diffuse lesions were accurately and completely removed; ④ The uterine myometrium and serosa were sutured layer by layer with absorbable sutures to reconstruct the normal anatomical structure of the uterus; ⑤ The tourniquet was loosened, and the abdominal cavity was closed layer by layer after confirming no oozing of blood.

Routine anti-infection, hemostatic and fluid replacement treatments were given after surgery. Patients were instructed to get out of bed and activity 6 hours after surgery, and sutures were removed 7 to 10 days later. Patients were discharged if no abnormalities were found 1 to 3 days after surgery.

2.3 Observation Indicators

1. Baseline data: Age, nationality, disease course, previous drug treatment history and surgical history;

2. Surgical indicators: Operation time, intraoperative blood loss, incision healing, and occurrence of intraoperative and postoperative complications;

3. Symptom improvement: The 10-point VAS was used to evaluate the degree of dysmenorrhea before surgery and 1 month after surgery (0 points for no pain, 10 points for severe pain); changes in postoperative menstrual volume were recorded (significant reduction, return to normal, no change, increase);

4. Long-term prognosis: Follow-up was conducted for 6 to 240 months by telephone, WeChat and reexamination, and recurrence was recorded (recurrence definition: dysmenorrhea VAS ≥ 6 points and imaging examination suggesting the appearance of new lesions).

2.4 Statistical Methods

SPSS 26.0 software was used for statistical analysis. Measurement data were expressed as $(\bar{x} \pm s)$, and the paired sample t-test was used to compare the VAS scores of dysmenorrhea before and after surgery; count data were expressed as $n(\%)$, and the χ^2 test was used. A P value < 0.05 was considered statistically significant.

3. Results

3.1 Baseline Data

Among the 269 patients, 215 cases (79.9%) were aged 30 to 45 years; 158 cases (58.7%) had a disease course of 5 to 10 years. Regarding previous treatment history: 222 cases (82.5%) received conservative treatment, including 98 cases (36.4%) with GnRH-a treatment, 76 cases (28.3%) with progestogen treatment, and 48 cases (17.8%) with levonorgestrel-releasing intrauterine system treatment; 33 cases (12.3%) had a history of recurrence after focal resection in local hospitals, with a recurrence time of 1 to 5 years; 14 cases (5.2%) did not receive any previous treatment.

3.2 Surgery-Related Indicators

All patients successfully completed the surgery without conversion to total hysterectomy, and no serious complications such as uterine perforation, adjacent organ injury and massive intraoperative hemorrhage occurred. The mean operation time was (102.5 ± 28.6) minutes, the mean intraoperative blood loss was (320.5 ± 85.2) ml, and no intraoperative blood transfusion was performed. All surgical incisions achieved primary healing without complications such

as infection, dehiscence and fat liquefaction, and all patients were discharged smoothly.

3.3 Postoperative Symptom Improvement

1. Dysmenorrhea improvement: The preoperative VAS score for dysmenorrhea was (8.6 ± 1.2) points, and it was (1.5 ± 0.8) points 1 month after surgery, with a significant decrease in the postoperative score ($t = 89.6$, $P < 0.001$). Among them, 212 cases (78.8%) had complete relief of dysmenorrhea, 53 cases (19.7%) had significant improvement, and 4 cases (1.5%) had mild improvement, with an effective rate of dysmenorrhea relief of 98.5%.

2. Menstrual volume changes: The menstrual volume of all patients was significantly reduced after surgery without no change or increase. The menstrual volume of 248 cases (92.2%) returned to normal, and 21 cases (7.8%) had mild reduction without amenorrhea. All patients were satisfied with the improvement effect of menstrual volume.

3.4 Long-Term Postoperative Recurrence

All 269 patients completed long-term follow-up with a mean follow-up of (118.5 ± 65.2) months. Only 1 38-year-old Thai female had recurrence 36 months after surgery, with a dysmenorrhea VAS of 7 points and MRI suggesting a small amount of new lesions in the posterior uterine wall, resulting in a recurrence rate of 0.3%. The patient refused reoperation and received GnRH-a treatment, with relieved symptoms and stable condition in subsequent follow-up.

4. Discussion

4.1 Global Treatment Dilemma of Diffuse Adenomyosis

The lesion characteristics of diffuse adenomyosis make its treatment much more difficult than that of localized lesions, and the global clinical practice is faced with the dual dilemma of "ineffective conservative treatment and radical cure requiring sacrifice of the uterus" [7]. Drug treatment relieves symptoms by inhibiting ovarian function and reducing estrogen levels, but cannot remove lesions in the myometrium, with an extremely high recurrence rate after drug withdrawal, and side effects of long-term medication cause some patients to stop medication compulsively [8]. Traditional laparoscopic focal resection cannot accurately distinguish diffuse lesions from normal myometrium, leading to incomplete lesion removal and a postoperative

recurrence rate of 20% to 30%^[9]. Although total hysterectomy can achieve radical cure, it deprives patients of fertility rights, also affects pelvic floor function and endocrine balance, and causes a series of physical and psychological problems^[5].

In this study, 82.5% of patients had a history of conservative treatment and 12.3% had a history of recurrence after traditional uterus-preserving surgery, which fully reflects the global treatment status of patients and also confirms that the clinical practice is in urgent need of a safe, effective and low-recurrence uterus-preserving treatment plan. The emergence of uterus-preserving U-surgery just fills this gap.

4.2 Core Advantages of Uterus-Preserving U-Surgery

The results of this study confirm that uterus-preserving U-surgery has significant advantages in the treatment of diffuse adenomyosis in patients outside Chinese Mainland, which are specifically reflected in three aspects:

1. High safety and controllable trauma: In this study, the mean intraoperative blood loss of patients was 320.5 ml, without intraoperative blood transfusion and serious complications, and all incisions achieved primary healing. The surgical procedure effectively reduces bleeding through a tourniquet at the uterine isthmus, and the open surgery provides a clear surgical field of vision, avoiding the limitations of laparoscopic surgery in the observation and operation of diffuse lesions, reducing surgical risks with strong operational controllability, and is suitable for international patients of different ages and physical conditions^[6].

2. Significant symptom improvement and improved quality of life: Dysmenorrhea and menorrhagia are the most core sufferings of patients. In this study, the effective rate of postoperative dysmenorrhea relief was 98.5%, the menstrual volume of all patients was significantly reduced, and 92.2% returned to normal. Uterus-preserving U-surgery eliminates the stimulation of lesions on the uterine myometrium from the root by completely removing lesions, with curative effects far superior to medication and minimally invasive interventional therapy^[10], and significantly improves patients' quality of life.

3. Extremely low recurrence rate and realization of uterus-preserving radical cure: Recurrence rate is the core evaluation index of the curative effect of uterus-

preserving surgery. The recurrence rate in this study is only 0.3%, which is much lower than that of traditional uterus-preserving surgery^[9]. The core reason is that the U-shaped approach can go deep into the deep layer of the myometrium to accurately and completely remove all diffuse lesions and avoid residue; at the same time, layered suture reconstructs the uterine morphology and restores the normal anatomical structure, fundamentally reducing the possibility of recurrence^[6], and truly realizing the dual goals of "uterus preservation" and "radical cure".

4.3 International Application Value of Uterus-Preserving U-Surgery

The patients in this study were from 22 countries worldwide, covering different continents and races, with differences in the severity of the disease and previous treatment history, but all achieved good curative effects, confirming that uterus-preserving U-surgery has a wide range of applicability without being limited by regions and races, and has important international application value^[11].

With the improvement of global women's health awareness, more and more patients refuse total hysterectomy, and the demand for uterus preservation is increasingly strong^[12]. As an original gynecological technology in China, uterus-preserving U-surgery fills the gap in the global uterus-preserving radical treatment of diffuse adenomyosis, provides an effective treatment option for global patients, and also offers new surgical ideas for international gynecologists^[13]. Over the past 20 years, our center has performed surgery for patients from many countries and achieved good curative effects, which has promoted the international dissemination of Chinese gynecological technology and facilitated technical exchanges and cooperation in the international gynecological field^[14]. In addition, the surgical procedure is standardized and easy to popularize, and can be carried out in primary and international gynecological medical institutions after systematic training, laying a foundation for its global promotion^[15].

4.4 Study Limitations and Prospects

This study is a single-center retrospective study with certain limitations: no control group was set up, so direct comparison with traditional uterus-preserving surgery and minimally invasive interventional therapy

could not be made ^[16]; the follow-up time span was large (6 to 240 months), which might affect the evaluation of long-term recurrence rate ^[17]; fertility outcomes were not included in the analysis, so the impact of surgery on fertility could not be assessed ^[18].

In the future, multicenter, prospective and randomized controlled studies will be carried out to compare the curative effects of uterus-preserving U-surgery with traditional treatment plans ^[19]; the follow-up time will be uniformly extended, with a focus on the 5-year and 10-year long-term recurrence rates after surgery; fertility outcomes will be included as observation indicators to analyze the impact of surgery on ovarian function, endometrial receptivity and pregnancy rate, providing more comprehensive clinical references for patients with fertility wishes ^[20].

5. Conclusion

Through the analysis of clinical data of uterus-preserving U-surgery in 269 patients with diffuse adenomyosis outside Chinese Mainland over 20 years, this study confirms that the surgical procedure has high safety with less intraoperative blood loss and few complications, which can significantly relieve dysmenorrhea and reduce menstrual volume with a long-term recurrence rate of only 0.3%. It can effectively meet the uterus-preserving demand of global patients with diffuse adenomyosis and solve the dilemma of international clinical treatment.

As an original gynecological surgical technology in China, uterus-preserving U-surgery provides a new option for the global treatment of diffuse adenomyosis. Its international application has promoted the external exchange of Chinese gynecological technology and contributed a Chinese solution to the global cause of women's health. This surgical procedure is an ideal uterus-preserving plan for the treatment of diffuse adenomyosis and is worthy of further promotion and application worldwide.

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