

A novel laparoscopic surgical technique for severe adenomyoma

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Summary

Objectives: The aim of this study was to investigate the feasibility and safety of the treatment of laparoscopic adenomyomectomy for severe adenomyoma. **Study design:** The study included 216 patients with severe adenomyoma, who underwent a laparoscopic adenomyomectomy between January 2008 and September 2012 in the Department of Gynecology, Second People's Hospital of Changzhou, affiliated with Nanjing Medical University. **Results:** The mean age of the patients was $37 (\pm 3.3)$ years and the BMI was $26 (\pm 2.7)$. The volume of bleeding during surgery was 150.2 ± 22.7 ml, the mean operative time was 60 ± 48.6 minutes, the mean time for anal exhaust was 1 ± 1.8 days, and the mean time of hospital stay was 5 ± 1.2 days. During the surgeries, no bladder or bowel injuries occurred, and all the surgeries were completed successfully, with no conversions to open laparotomies. Of the 176 patients, 170 (96.6%) showed significant improvement in their dysmenorrheal symptoms after the surgeries, whereas six patients had a poor clinical outcome. Of the 157 patients, 151 (96.2%) had an obvious effect on their menstrual cycle. **Conclusions:** Laparoscopic adenomyomectomy is feasible and safe for severe adenomyoma.

Key words: Laparoscopic adenomyomectomy; Adenomyoma; Adenomyosis.

Introduction

Adenomyosis of the uterus is a common phenomenon among women of reproductive age. Uterine adenomyosis is a pathological phenomenon in which the endometrial glands and stroma invade the myometrium, although the normal growth is intrauterine. The cause of adenomyosis is unknown, and some studies have suggested that certain relative factors, such as implantation, immunity, metaplasia, and genetic factors are related to adenomyosis. Pregnancy and delivery, relapse-induced abortions, and endometritis are closely related to adenomyosis, and women who undergo uterine surgery are at risk for the condition. Adenomyosis is divided into the following types: diffuse and localized, and the latter is characterized as an adenomyoma. Adenomyosis leads to dysmenorrhea, lower abdominal discomfort, menorrhagia, and polymenorrhea, which could cause infertility and spontaneous abortion; some cases could be asymptomatic and difficult to identify from uterine myomas.

Adenomyosis is diagnosed by a postoperative pathological analysis. The adenomyosis diagnosis rate could be improved by evaluation of progressive dysmenorrhea, menstrual disorders, and menorrhagia, and a pelvic examination is efficacious in the diagnosis. Ultrasonography, particularly transvaginal ultrasonography, facilitates the identification or classification of the disease, and improves the accuracy of the diagnosis. In some cases, the features of adenomyosis are

miniscule, subtle and non-specific, and pelvic magnetic resonance imaging (MRI) might be necessary. MRI is more advantageous for the diagnosis of uterine adenomyosis because of its excellent soft-tissue resolution and multiple plane imaging. However, the high cost limits the functionality of MRI.

The treatment of adenomyosis is individual and should be based on the age of the patient, the clinical symptoms, and childbearing considerations. Patients with mild symptoms could be treated with anti-inflammatory pain-killers and a levonorgestrel-releasing intrauterine device could be used for the treatment of adenomyoma. Gonadotropin-releasing hormone analogues (GnRHa) are used to relieve severe symptoms, such as dysmenorrhea, lower abdominal discomfort, menorrhagia, and polymenorrhea. GnRHa is more efficient than other drugs and plays a role in the down-regulation of the hypothalamic-pituitary-ovary axis, which could lead to female climacteric syndrome including hot flashes, insomnia, loss of muscle tone, and osteoporosis. GnRHa is more efficient for adenomyosis than other drugs, however symptom relapse occurs after cessation of GnRHa. For the patients with severe symptoms, the definitive treatment plan for adenomyosis has been a hysterectomy. In recent years, social conditions have resulted in more patients selection uterus-saving treatment, for fertility or other reasons.

Adenomyosis is divided into two types: diffuse and lo-



Figure 1. — Ultrasound showing adenomyosis.



Figure 2. — MRI showing adenomyosis.

calized, which is characterized by an adenomyoma.

For patients with severe symptoms, ultrasonography and the pelvic MRI facilitate the diagnose of adenomyoma, and an adenomyomectomy, particularly an abdominal or laparoscopic one, has become possible for those women. Compared with an abdominal adenomyomectomy, a laparoscopic adenomyomectomy has several advantages, including better visualization, less invasion, faster recovery, fewer adhesions, and shorter duration of hospitalization. However, it has not been recommended for widespread use for a number of reasons, such as the difficulty of surgery, as well as the risk of uterine rupture and adenomyoma relapse. The present study aimed to demonstrate the validity, reliability, and security of adenomyosis treatment with a laparoscopic adenomyomectomy.

Materials and Methods

The study included 216 patients with severe adenomyosis, who underwent surgery with a laparoscopic adenomyomectomy between January 2008 and September 2012 in the Department of Gynecology of Second People's Hospital of Changzhou, an affiliate of Nanjing Medical University. The degree of dysmenorrhea score was based on a visual analogue scale (VAS).

Before each surgery, the patients' medical history was carefully collected and each patient underwent medical examinations and pelvic examinations. Ultrasonography and the pelvic MRI were used to diagnose adenomyoma in the patients with severe symptoms. The exclusion criteria included size >16 weeks of gestation, and adenomyoma size > 8 cm. An adenomyoma in the posterior uterine wall of one patient is shown by ultrasound, MRI, and laparoscopy (Figures 1-4)

All of the patients who participated in this study did so in the context of mutual trust, open communication, and informed consent. The study received approval from the ethics committee. All the surgeries were performed by Professor Ruxia Shi, with the same nursing team.

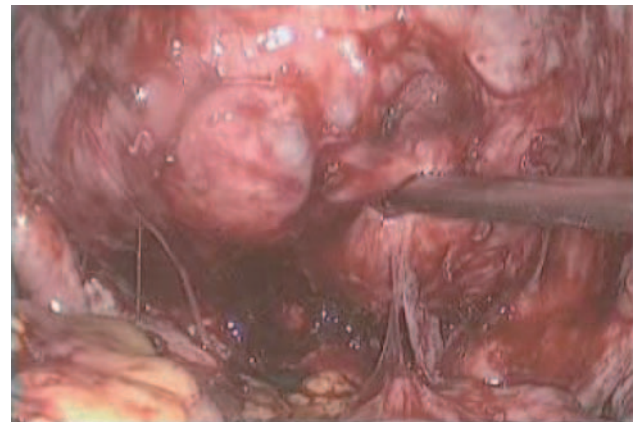


Figure 3. — Laparoscope showing adenomyosis.

Operative procedure

After general anesthesia was administered via an orogastric tube, the patients were placed in the Trendelenburg position. After the abdominal cavity was filled with CO₂, a ten-mm trocar was placed through the umbilicus, and three five-mm trocars were placed in the hypogastrium. A uterine manipulator was placed in the uterine cavity to assist the movement of the uterus.

Pituitrin was injected into the myometrium of the uterus to reduce the risk of bleeding (Figure 5). In the middle of the adenomyoma, a transverse incision was made by the monopolar electrocoagulation through a five-mm trocar. An ultrasonic scalpel and aspirator/irrigator probe were used to help separate the adenomyoma (Figure 6). The aspirator/irrigator probe washes blood in the operating field. The purpose of the surgery was resection of the regional lesions (Figure 7), relief of symptoms, and to recovery function.

The incision in the uterus was sutured continuously by 1-0 vicryl in two or three layers (Figure 8). No dead space and hem-



Figure 4. — An adenomyoma in the posterior uterine wall before the operation.

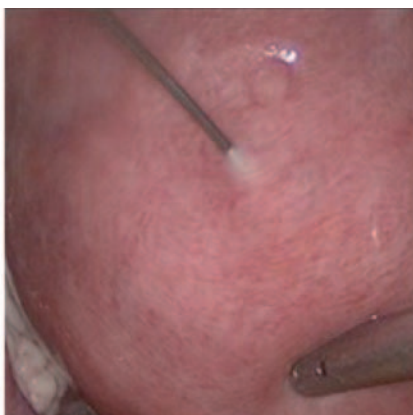


Figure 5. — Pituitrin is injected in the uterine myometrium to reduce the risk of bleeding.

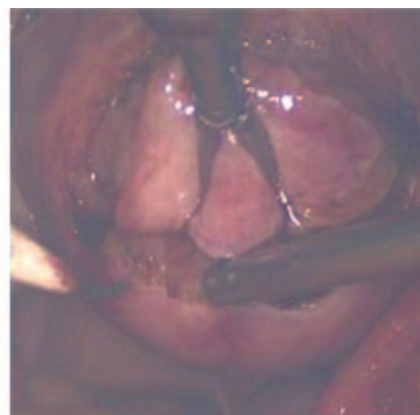


Figure 6. — A transverse incision is made in the middle of the adenomyoma by monopolar electrocoagulation.

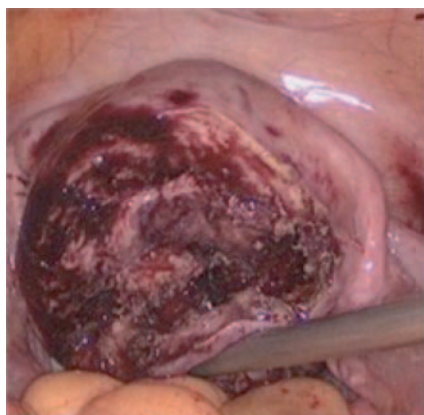


Figure 7. — The incision in the uterus after the removal of the adenomyoma.

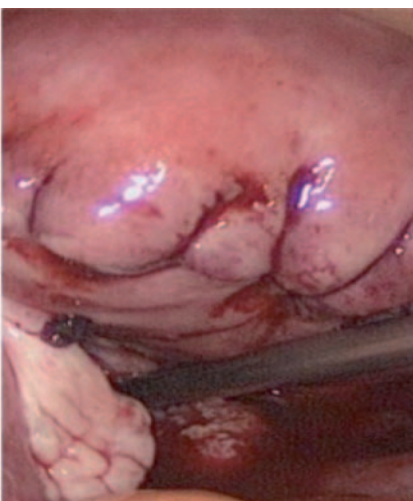


Figure 8. — The incision in the uterus is sutured continuously by 1-0 vicryl.

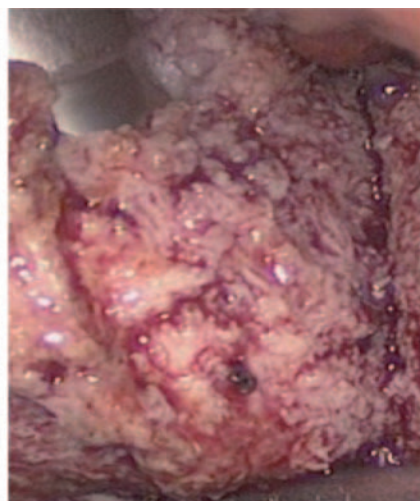


Figure 9. — The adenomyoma is removed by morcellation.

orrhaging was observed in the myometrium. Then, the adenomyoma was removed by morcellation (Figure 9). During the procedure, attention was focused on the position of the pelvic organs to avoid damage. The pelvic cavity was washed with 1,000 ml of saline to reduce adhesions. All the removed tissue were analyzed by the pathology department.

All the patients had a follow-up evaluation at one, three, and six months, and then at one and two years. The Student's *t*-test and chi-square test were applied for the data in this study, and a *p*-value < 0.01 was considered statistically significant.

Results

In this study, 216 patients underwent a laparoscopic adenomyomectomy. The patient characteristics are shown in Table 1. The mean age of the patients was 37 (± 3.3) years, and the BMI was 26 (± 2.7). In total, 98 patients had a history of pelvic surgeries. The operative and postoperative outcomes are shown in Table 2. In total, 176 patients experienced

Table 1. — Patient characteristics.

Characteristics	n	Mean \pm SD	%
Age	216	37 \pm 3.3	
BMI		26 \pm 2.7	
History of pelvic surgery	98		
clinical symptoms			
Severe dysmenorrhea	176		81.48
Menorrhagia and polymenorrhea	157		72.69
Infertility	96		44.44

severe dysmenorrhea, and the prevalence of severe dysmenorrhea in this study was 81.48%. In total, 157 patients experienced menorrhagia and polymenorrhea, with a prevalence of 72.69%. The primary infertility and secondary infertility rate was 44.44% (96/216).

The volume of bleeding during surgery was 150.2 \pm 22.7

Table 2. — *Operative and postoperative conditions.*

	n	Mean \pm SD	%
Mean operating time (minutes)		60 \pm 48.6	
Blood loss during the operation (ml)		150.2 \pm 22.7	
Time for anal exhaust (day)		1 \pm 1.8	
Days of hospital stay (day)		5 \pm 1.2	
Bladder injury	0		0
Bowel injury	0		0
Conversion to laparotomy	0		0

ml, the mean operative time was 60 \pm 48.6 minutes, the mean time for anal exhaust was one \pm 1.8 days, and the mean duration of the hospital stay was five \pm 1.2 days. During the surgeries, there were no bladder or bowel injuries, and all the surgeries were completed successfully with no conversions to open surgery (Table 2).

The outcome and surgical efficacy of each surgery was investigated at one- to 24-month follow-up examinations. At the six-month follow-up, most patients had good outcomes. The follow-up data dysmenorrhea, menorrhagia, and polymenorrhea are shown in Table 3. Of the 176 patients, 170 (96.6%) showed significant improvements in the symptoms of dysmenorrhea after surgery, whereas six patients had a poor clinical outcome. In 151 (96.2%) of the 157 patients, there was an obvious effect on the menstrual cycle.

Of the 97 patients who wanted to maintain their fertility, 77 (79.4%) had their successful pregnancies by natural conception or assisted reproduction within two years following surgery and 50 (51.5%) patients delivered at term. All of the 50 women were delivered by cesarean section, and 44 patients returned to the present hospital for their operations. Seven (15.9%) patients who returned had severe pelvic adhesions, 22 (50%) patient had mild or moderate adhesions, and 15 (34.1%) had no obvious adhesions.

Discussion

Adenomyosis is a common diseases in women of child-bearing age [1]. Adenomyosis is divided into two types: diffuse and localized, and the latter is characterized by the presence of an adenomyoma. In recent years, social developments have resulted in more patients selecting uterus-saving treatment for fertility or other reasons. In patients with severe symptoms, that are not alleviated by a levonorgestrel-releasing intrauterine device or GnRHa, particularly an abdominal or laparoscopic adenomyomectomy is practical for women in whom preservation of the uterus is important. A laparoscopic adenomyomectomy has several advantages, including better visualization, a lower degree of invasion, faster recovery, fewer adhesions, and shorter duration of hospitalization.

Research has shown that laparoscopic adenomyomec-

Table 3. — *Postoperative dysmenorrhea, menorrhagia, and polymenorrhea.*

Clinical symptoms	Decrease (n)	No effect (n)	Increase (n)
Severe dysmenorrhea	170	5	1
Menorrhagia and polymenorrhea	151	4	2

tomy is seldom used and one reason for this lack of use is the difficulty of identifying the adenomyosis location. To solve this problem, transvaginal ultrasonography was used to identify and locate the adenomyosis for every patients before surgery. In some cases, pelvic MRI has been considered. MRI has more advantages for the diagnosis of uterine adenomyosis because of its excellent soft-tissue resolution and multiple plane imaging. Some reviews of the accuracy of ultrasonography, particularly transvaginal color Doppler sonography (TVCDs), and MRI for the diagnosis and differential diagnosis of uterine adenomyoma, showed that ultrasonography and MRI were useful examinations [2]. In the present study, TVCDs, and MRI were used before surgery, which increased the surgical accuracy.

Another limitation on the use of the laparoscopic adenomyomectomy procedure is uterine bleeding during surgery, difficulty suturing, and the pelvic adhesion after the operation. Pituitrin was injected in the uterine myometrium to reduce the risk of bleeding and was used once or twice during the operation, additionally the authors cauterized the uterine incision to reduce the risk of bleeding. In the middle of the adenomyoma, they performed a transverse incision by monopolar electrocoagulation, which was easier to suture. The uterine surgical defect was continuously sutured with 1-0 vicryl (Figure 9) in two, three or four layers, which depended on the depth of the uterine incision and no dead space was created during the suturing. The pelvic cavity was washed carefully and repeatedly to reduce the adhesions, and sodium hyaluronate covered the uterine surgical defect, which prevented the adhesions.

The final limitation on the development of the laparoscopic adenomyomectomy procedure was the post-operative recurrence. In theory, complete removal of an adenomyoma could reduce the risk of recurrence. In the present study, the authors removed the regional lesions as much as possible. After the surgery, all the patients were treated monthly with GnRHa monthly for three or six months to prevent recurring attacks. GnRHa decreases the expression of aromatase cytochrome P450, which is related to the recurrence of adenomyomas [3]. For the postoperative patients who were not planning for fertility, using LNG-IUD as an adjunct treatment was safe and effective and could decrease recurrence rate.

In the present study, the pregnancy rate was 79.4%

after laparoscopic adenomyomectomy surgeries and the fertility rate was 51.5%. All of the 50 women were delivered by cesarean section, and 44 patients returned to the present hospital for their surgeries, Seven of the patients (15.9%) who returned were found to have severe pelvic adhesions, 22 (50%) patients had mild or moderate adhesions, and 15 (34.1%) patients had no obvious adhesions. The present authors found that a laparoscopic adenomyomectomy could enhance fertility and reduce pelvic adhesions. However, the pregnancy outcomes require long-term follow-up in future studies. This study shows that laparoscopic adenomyomectomy is feasible and safe for severe adenomyosis.

References

- [1] Farquhar C., Brosens I.: "Medical and surgical management of adenomyosis". *Best Pract. Res. Clin. Obstet. Gynaecol.*, 2006, 20, 603.
- [2] Champaneria R., Abedin P., Daniels J., Balogun M., Khan K.S.: "Ultrasound scan and magnetic resonance imaging for the diagnosis of adenomyosis: systematic review comparing test accuracy". *Acta Obstet. Gynecol. Scand.*, 2010, 89, 1374.
- [3] Ishihara H., Kitawaki J., Kado N., Koshiba H., Fushiki S., Honjo H.: "Gonadotropin-releasing hormone agonist and danazol normalize aromatase cytochrome P450 expression in eutopic endometrium from women with endometriosis, adenomyosis, or leiomyomas". *Fertil. Steril.*, 2003, 79, 735.

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