

## Case Report

# U-shaped suture in treatment of diffuse uterine leiomyomatosis: a case report

Biao Tang<sup>1</sup>, Dexin Chen<sup>1</sup>, Hong Wan<sup>1</sup>, Lin Zhuang<sup>2</sup>, Jing Wang<sup>1</sup>, Min Li<sup>1</sup>

<sup>1</sup>Sichuan Provincial Maternity and Child Health Care Hospital, Chengdu 610045, China; <sup>2</sup>The Affiliated Hospital of Chengdu Traditional Chinese Medicine University, Chengdu 610075, China

Received January 24, 2021; Accepted April 14, 2021; Epub April 15, 2021; Published April 30, 2021

**Abstract:** Objective: To report a case of myomectomy for diffuse uterine leiomyomatosis by U-shaped suturing the uterus. Methods: This is a retrospective report. A 33 years old nulliparous woman was presented with menorrhagia and infertility. She had multiple small fibroids of 2-50 mm size throughout the myometrium. The symmetrically enlarged uterus was 135×88×85 mm, clinically corresponding to that of 4-months gestation, to preserve her reproductive function, we did a surgery of myomectomy by laparotomy, U-shaped suture was used. After surgery, the patient got GnRHa injection. Results: Enlarged uterus reduced to almost normal size after 3 doses of GnRHa. She does not experience heavy bleeding during menstruation after surgery. It is a pity that she does not get pregnant. Conclusion: U-shaped suture plays an important role in reducing bleeding and preserving the uterus.

**Keywords:** Uterine leiomyomatosis, U-shaped suture, GnRHa, myomectomy

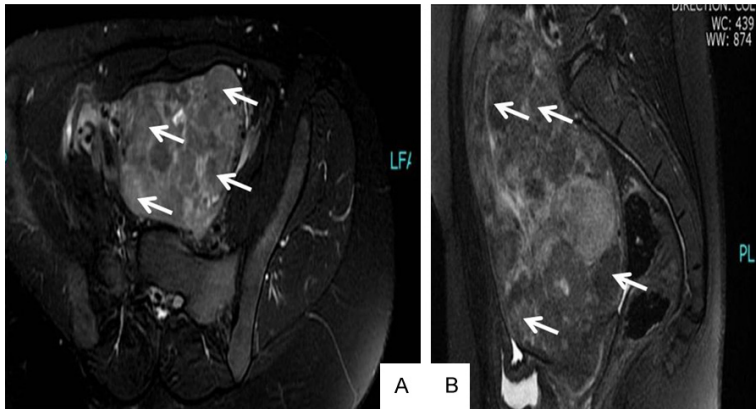
## Introduction

Diffuse uterine leiomyomatosis is a rare disease, which occurs mostly in women of child-bearing age. The enlarged uterus is presented with a large number of about 0.5-3.0 cm leiomyomas which will result in increased menstrual blood volume and infertility. The classic treatment method is total hysterectomy. It is difficult to preserve the uterus [1, 2].

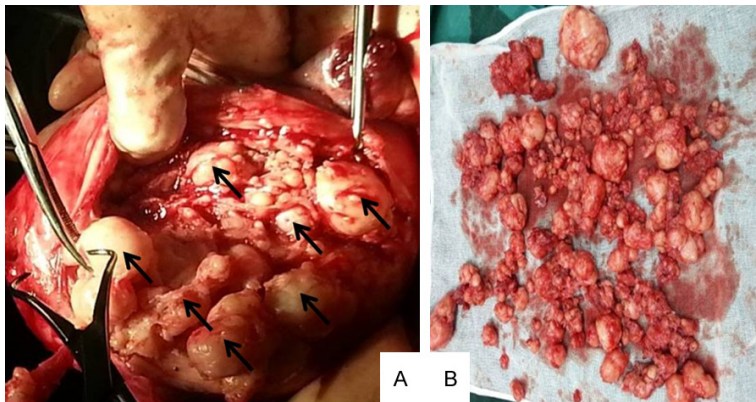
Women of childbearing age who are diagnosed with diffuse uterine leiomyomatosis will choose conservative treatment because they have fertility requirements or they're still young. The current conservative treatment methods include uterine artery embolization, hysteroscopic submucosal myomectomy and GnRHa therapy [3-5]. With GnRHa therapy after no leiomyomas protruding to the uterine cavity were found in hysteroscopy, or the disappearance of leiomyomas protruding to the uterine cavity after GnRHa therapy, it is expected to achieve pregnancy [6]. Or GnRHa is used as preoperative preparation for transabdominal myomectomy to reduce the difficulty of surgery. Pregnancy after uterine artery embolization has also been reported, but uterine artery

embolization is controversial for those with fertility requirements.

Transabdominal myomectomy is also a conservative treatment method. It can remove all leiomyomas as far as possible, restore the normal shape of the uterine cavity, alleviate clinical symptoms and reduce residual leiomyomas. Its main shortcomings are as follows. 1) Because of the large number of leiomyomas, and many uterine incisions and the large amount of bleeding during surgery, the risk of blood transfusion increases, and postoperative severe pelvic adhesion is prone to occur. 2) Removal of a large number of submucosal leiomyomas can cause great damage to the endometrium and intrauterine adhesion, leading to amenorrhea and infertility. 3) Some leiomyomas are small with unclear boundaries, so it is difficult to remove them completely. They are likely to recur and grow fast in a short time after surgery. 4) The boundaries between leiomyomas and normal myometrium are not clear. Surgery cannot avoid removing many myometrium, which will destroy the integrity of the uterine myometrium and increase the risk of uterine rupture during pregnancy after surgery [3].



**Figure 1.** Imaging features. A, B. MRI before surgery, part of the lesions are marked with arrows.



**Figure 2.** Intraoperative situation. A. Uterus during surgery; B. Myoma of uterus removed. Part of the lesions are marked with arrows.

Masato Nishida et al. developed a novel myomectomy technique involving longitudinal dissection of the uterus in the midline. On each side of the anterior and posterior walls, the uterine wall was further divided into two pieces from the incision site. Myomas were separated into serosal and mucosal sides, and then enucleated for removal from the thinned myometrium [1], what we did is different from that, during the process, suture method is the significant difference and the U-shaped suture helps keeping more myometrium.

We performed transabdominal myomectomy for a woman of childbearing age with 256 leiomyomas removed. The uterus was sutured with U-shaped suture method. The patient recovered well after surgery. Four-years follow-up shows normal menstrual blood volume and cycle, no recurrence of leiomyomas are found up to now. The case is reported below.

### Case report

The patient (33 years old, GOP0) was admitted to our hospital on January 30, 2015, because of increased menstrual blood volume for more than 4 years. More than 4 years before admission, the patient was diagnosed with multiple uterine leiomyomas in the other hospital because of increased menstrual blood volume, and received transabdominal myomectomy (complaining that more than 30 leiomyomas were removed). After surgery, menstrual blood volume returned to normal level and outpatient follow-up was conducted. More than 2 years before admission, menstrual blood volume increased again, symptoms such as dizziness and fatigue occurred, and hemoglobin was about 60 g/l. However, she refused to be hospitalized again. Then, dizziness and fatigue aggravated, hemoglobin decreased to 57 g/l and she was re-hospitalized. Magnetic resonance imaging (Figure 1) showed significantly increased uterine

volume, with a size of about 13.5×8.8×8.5 cm. The myometrium of the anterior and posterior uterine wall presented diffuse round lesions of different sizes, most of which had visible boundaries, especially in the posterior wall. The largest lesion was located in the inferior segment of the posterior uterine wall, which was about 3.8×3.1×4.2 cm. The uterine endometrium was thin, and the uterine myometrium was diffused with multiple leiomyomas, accompanied by degeneration. Abnormal signal foci were found in the uterine cavity, which were suspected as submucosal leiomyomas. After admission, blood transfusion and anemia correction were carried out, malignant endometrial lesions were excluded. Then, transabdominal myomectomy was conducted, during which the uterus was found to be enlarged like 4-months pregnancy, with uneven surface. Several leiomyomatous nodules could be touched in the

## U-shaped suture in leiomyomatosis

anterior and posterior wall and uterine cavity, with a diameter of 0.2-5 cm. A total of 256 uterine leiomyomas were removed one by one (**Figure 2**). Intraoperative bleeding volume was about 2,200 ml and 3 U red blood cell suspension was infused. The patient was discharged 7 days after surgery, and administrated with GnRHa for 3 courses. Afterwards, the patient presents regular menstrual cycles, low menstrual blood volume and no dysmenorrhea. On February 2, 2016, color Doppler ultrasound showed that the size of the uterus was about 4.6×3.4×3.8 cm, the echoes of the muscular wall was inhomogeneous, multiple weak echo nodules at different sizes were visible (the largest, about 0.7×0.6 cm), the uterine cavity shape was tortuous, and the endometrium had a thickness of about 0.3 cm and was homogeneous. Therefore, another 3 courses of GnRHa were administrated. Thereafter, the patient was followed up every half a year to 1 year. Up to now, the menstrual condition of the patient was the same as that after surgery. The patient failed in vitro fertilization and embryo transfer in 2017.

Informed consent was obtained from the patient, and she agreed to public the case. This study was approved by the Ethics Committee of our hospital (approval number: SFY-LL-190312).

### *Surgical method*

Uterine condition was detected by routine laparotomy. Ureteral ligation of the lower uterine segment was performed with intermittent loosening, to reduce intraoperative bleeding [7-9]. The place with dense leiomyomas was touched and cut longitudinally until it was deep enough to remove the leiomyomas. After removing as many leiomyomas as possible through an incision, the needle was inserted into the uterine seromuscular layer, reaching to the base of the incision, and out of the seromuscular layer on the other side of the incision. Then, the needle was inserted into the uterine seromuscular layer 1 cm away from the needle outlet, and out from the seromuscular layer of the other side through the base of the incision. The dead space was closed by knotting. The seromuscular layer surface was sutured intermittently or continuously to form a smooth surface.

Remaining leiomyomas were treated by the same method, and the normal myometrium was preserved as far as possible during myomectomy.

### **Discussion**

According to literature review, transabdominal myomectomy is rarely used in patients with diffuse uterine leiomyomatosis, we did not find better suture method to deal with uterine incision. In regular myomectomy, suture methods include varus suture, uninterrupted or interrupted suture, purse string suture, baseball stitching, loop ligature and so on, but none of this is used to do diffuse uterine leiomyomatosis surgery [10-14].

Masato Nishida et al. developed a novel myomectomy technique involving longitudinal dissection of the uterus in the midline, just like that in adenomyosis, they performed the surgery for 7 patients [1]. What we did is different from that, but unfortunately we just had 1 patient.

In order to avoid the mentioned shortcomings of myomectomy as far as possible during this transabdominal surgery, we made as few myometrial incisions as possible, removed as many leiomyomas as possible at each myometrial incision, and reserved as many normal myometrial tissues as possible when removing leiomyomas, and adopted U-shaped suture for the myometrium with the help of ureteral ligation of the lower uterine segment to reduce bleeding. U-shaped suture penetrated the dead space and had a good effect on closing it. Therefore, bleeding was reduced obviously at the sutured places. However, because of 256 leiomyomas were removed, 3 U blood transfusion was carried out during the surgery. GnRHa drugs were administrated for 3 cycles after surgery immediately and 1 year after surgery, respectively. No recurrence occurred in more than 4 years after surgery. We believe that U-shaped suture plays an important role in reducing bleeding and preserving the uterus.

**Table 1** the relevant literature shows multiple surgical/treatment methods for diffuse uterine leiomyomatosis, including Nafarelin acetate, GnRH analogue, Uterine artery embolization (UAE), hysteroscopic myomectomy, high-inten-

# U-shaped suture in leiomyomatosis

**Table 1.** The relevant literature

|   | Author                    | Year | Number of case | Surgical/treatment method   |
|---|---------------------------|------|----------------|---|
| 1 | Luigi Fedele et al.       | 2004 | 3              | 2 cases were done “extreme” myomectomy, including the removal of a large portion of corporal myometrium, 1 case was treated only medically with GnRH analogues (GnRH-a)   |
| 2 | A Coskun et al.           | 2008 | 1              | hysterectomy  |
| 3 | Yoshihiko Shimizu et al.  | 2009 | 1              | Nafarelin acetate for 6 months→hysteroscopic myomectomy   |
| 4 | Ramkrishna Purohit et al. | 2011 | 1              | GnRH analogue (GnRHa;) 3.75 mg per month for 6 months   |
| 5 | Jieun Koh et al.          | 2012 | 7              | Uterine artery embolization (UAE)   |
| 6 | Masato Nishida et al.     | 2014 | 7              | Longitudinal dissection of the uterus in the midline. On each side of the anterior and posterior walls, the uterine wall was further divided into two pieces from the incision site. Myomas were separated into serosal and mucosal sides, and then enucleated for removal from the thinned myometrium. |
| 7 | Xiaofei Zhang et al.      | 2020 | 8              | high-intensity focused ultrasound (HIFU)  |

sity focused ultrasound (HIFU), removal of a large portion of corporal myometrium, hysterectomy, most of these are conservative treatment, our method is different in removing the myoma and suturing the uterus (U-shaped suture).

In conclusion, transabdominal myomectomy may not be the preferred method in patients with diffuse uterine leiomyomatosis. However, for the patient with obvious uterine enlargement, not improved symptoms after hysteroscopic submucosal myomectomy alone and eagerness to retain the uterus, transabdominal myomectomy is also an option. U-shaped suture of the myometrium helps to reduce intraoperative bleeding. However, due to scarce cases, the exact effect still needs further clinical practice to prove.

## Acknowledgements

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from the patient, and she agreed to public the case.

## Disclosure of conflict of interest

None.

**Address correspondence to:** Dexin Chen, Sichuan Provincial Maternity and Child Health Care Hospital,

Chengdu 610045, China. Tel: +86-18908098201; ORCID number: 0000-0002-5735-8244; E-mail: 18908098201@163.com

## References

- [1] Nishida M, Ichikawa R, Arai Y, Sakanaka M and Otsubo Y. New myomectomy technique for diffuse uterine leiomyomatosis. *J Obstet Gynaecol Res* 2014; 40: 1689-1694.
- [2] Mazzon I, Favilli A, Grasso M, Morricone D, Di Renzo GC and Gerli S. Is ‘cold loop’ hysteroscopic myomectomy a better option for reproduction in women with diffuse uterine leiomyomatosis? A case report of successful repeated pregnancies. *J Obstet Gynaecol Res* 2015; 41: 474-477.
- [3] Fedele L, Bianchi S, Zanconato G, Carinelli S and Berlanda N. Conservative treatment of diffuse uterine leiomyomatosis. *Fertil Steril* 2004; 82: 450-453.
- [4] Purohit R, Sharma JG and Singh S. A case of diffuse uterine leiomyomatosis who had two successful pregnancies after medical management. *Fertil Steril* 2011; 95: 2434, e5-6.
- [5] Zhao H, Yang B, Li H, Xu Y and Feng L. Successful pregnancies in women with diffuse uterine leiomyomatosis after hysteroscopic management using the hysteroscopy endo operative system. *J Minim Invasive Gynecol* 2019; 26: 960-967.
- [6] Shimizu Y, Yomo H, Kita N and Takahashi K. Successful pregnancy after gonadotropin-releasing hormone analogue and hysteroscopic myomectomy in a woman with diffuse uterine leiomyomatosis. *Arch Gynecol Obstet* 2009; 280: 145-147.
- [7] Frederick J, Fletcher H, Simeon D, Mullings A and Hardie M. Intramyometrial vasopressin as a haemostatic agent during myomectomy. *Br J Obstet Gynaecol* 1994; 101: 435-437.

## U-shaped suture in leiomyomatosis

- [8] Bradley EA, Reidy JF, Forman RG, Jarosz J and Braude PR. Transcatheter uterine artery embolisation to treat large uterine fibroids. *Br J Obstet Gynaecol* 1998; 105: 235-240.
- [9] Schifano MJ, Hoshaw NJ, Boushka WM and Alvero RJ. Uterine artery embolization in a hemorrhaging postoperative myomectomy patient. *Obstet Gynecol Surv* 1999; 54: 1-4.
- [10] Xie L, Liu Y, Wang D, Liu C, Zhou H, Lin Z and Lu H. Application of a 'baseball' suture technique in uterine myomectomy following laparoscopic enucleation of uterine leiomyoma (fibroid). *Med Sci Monit* 2018; 24: 3042-3049.
- [11] Liu D, Han M, Huang P, Li C and Li X. Use of the base purse-string suture approach to remove giant uterine fibroids during cesarean section. *J Int Med Res* 2020; 48: 300060519893868.
- [12] Li B, Zhang S, Ma N, Jiao Y, Zhou Y, Ni S, Han X, Liu X and Ouyang L. Combining situ-morcellation with continuous-fill-mattress suture in laparoscopic myomectomy: a surgical approach of choice for patients with large uterine fibroids. *Medicine (Baltimore)* 2017; 96: e7672.
- [13] Jeong JH, Kim YR, Kim EJ, Moon SH, Park MH, Kim JT, Kim JH and Lee KS. Comparison of surgical outcomes according to suturing methods in single port access laparoscopic myomectomy. *J Menopausal Med* 2015; 21: 47-55.
- [14] Fujimoto A, Morimoto C, Hosokawa Y and Hasegawa A. Suturing method as a factor for uterine vascularity after laparoscopic myomectomy. *Eur J Obstet Gynecol Reprod Biol* 2017; 211: 146-149.