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## Original Article

## A case-control study to compare the outcome of women treated by two minimally invasive procedures-ultraminilaparotomy myomectomy and laparoscopic myomectomy

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## ABSTRACT

**Objective:** Ultraminilaparotomy myomectomy (UMLT-M with less 4 cm transverse skin incision) and conventional 3-port wound laparoscopic myomectomy (LM) approaches were proposed as alternative minimally invasive procedures in the management of women with symptomatic uterine myomas but few studies have compared the outcomes of both procedures.

**Materials and methods:** Between January 2002 and December 2003, 71 patients undergoing UMLT-M were compared with those 71 women undergoing LM. The last data collection for all patients was done on 31 December 2016. The parameters for comparison included the characteristics of the uterine myomas, surgical parameters, morbidities, and outcomes. Surgical parameters included the operative time (minutes), estimated blood loss (milliliters), time for removal of drainage, percentage of blood transfusion and co-morbidities.

**Results:** Mean operative time in the LM group was significantly longer than that in the UMLT-M group (208.7 ± 65.9 vs. 98.0 ± 28.2 min,  $p < 0.001$ ). Intra-operative blood loss was significantly higher in the LM group than that in the UMLT-M group (210.9 ± 184.5 vs. 111.7 ± 108.4 ml,  $p < 0.001$ ). However, more patients had postoperative fever in the UMLT-M group (39.4% vs. 8.5%,  $p < 0.001$ ). The recurrence rate of myoma at 5-year follow-up was significantly different between two groups (35.2% of UMLT-M vs. 57.7% of LM,  $p = 0.007$ ), but there was no difference when follow-up time was over ten years. The location of the myoma recurrence was different between two groups with higher recurrence rates in the fundal and lateral sides of uterus in the UMLT-M group and in the anterior wall of uterus in the LM group. However, the overall symptom control, the need of repeated myoma-related surgery and subsequent pregnancy outcome of both groups seemed to be similar in both groups.

**Conclusions:** More operative time and more blood loss reflected that LM demanded skills, experience and equipment. Therefore, UMLT-M might be a feasible alternative choice in the management of uterine myomas, since it is an easy-to-perform and familiar technique, especially in the absence of suitable equipment or skilled operator. A large and randomized study is needed to confirm the above findings.

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## Introduction

Uterine fibroids (myomas or leiomyomas) are the most common benign tumors of the uterus [1,2], and majority of them are asymptomatic; therefore, no further intervention is needed [3–6]. Sometimes, uterine myomas result in abnormal uterine bleeding, pelvic pain, infertility, and miscarriage [7–10]. Myomectomy, rather than hysterectomy, can be one of the best options in the management of women with symptomatic uterine fibroids, who wish to preserve their childbearing capabilities or avoid hysterectomy for reasons other than fertility [11–16]. Currently, women have much concern of cosmetic benefits and low-traumatic procedures, which prompts the search for more conservative and minimally invasive surgical methods when surgical intervention is unpreventable [17–22].

The feasibility, safety and cosmetic advantages of laparoscopic myomectomy (LM) have been confirmed in the literature [23–26]. However, LM is still more complicated and technically challenging with a longer learning curve, and sometimes associated with catastrophic problems [27,28]. The minilaparotomy (MLPT with 4–8-cm transverse skin incision) myomectomy (MLPT-M) and ultraminilaparotomy (UMLT with less 4 cm transverse skin incision) myomectomy (UMLT-M) approaches were proposed as alternative minimally invasive procedures for LM [29–31]. Short hospital stay, rapid recovery and good cosmetic effects were also apparent in both procedures compared to conventional laparotomy [29,31]. Several studies have compared MLPT-M with LM [32–36], but only a small number of studies have been available to compare the outcome of UMLT-M and LM [37]. One study from Ciavattini and colleagues to show that LM seems to be the preferable approach for the treatment of large myomas of  $\geq 5$  cm, providing more rapid recovery compared to the UMLT-M, but the postoperative outcome, such as recurrence rate did not be mentioned [37].

The current study aimed to evaluate the outcomes of UMLT-M and LM in the management of women with symptomatic uterine fibroids.

## Materials and methods

Between January 2002 and December 2003, 71 patients undergoing UMLT-M treatment and 71 multivariable-matched women undergoing LM (1:1) were enrolled into the current study. The last data collection for all patients was done on 31 December 2016. This study was approved by the institutional Review Board of Taipei Veterans General Hospital.

These patients had to fulfill the criteria of uncomplicated myomas provided by the National Health Insurance Bureau in Taiwan, including (1) absence of previous abdominal or pelvic surgery, (2) a number of visible uterine masses (myomas)  $\leq 5$  intramural or subserous myomas (without peduncle), (3) a maximum diameter of not  $\leq 8$  cm, and (4) an absence of prominent or significant pelvic adhesion on clinical evaluation [29–31]. In addition, the patients had to fulfill the following 3 basic requirements: absence of preoperative or postoperative adjuvant therapy, absence of other pelvic pathologies, except fibroids, and a final follow-up in December 2015. The phrase “symptomatic” meant any disturbance induced by fibroids that troubled one's life, which has been described previously [29–31].

### Operative procedures

All operations were performed under general endotracheal anesthesia with the patients in the Trendelenburg position and the bladder catheterized. Diluted vasopressin (1:80) was injected into the myometrium around the fibroid nodules and directly into the

fibroid tissue of the patients to decrease intraoperative bleeding during both procedures.

### Ultraminilaparotomy myomectomy (UMLT-M)

The operative procedure for the UMLT-M group was similar to that in the conventional laparotomy group with some differences. First, a 2–4 cm (near 3 cm) transverse incision (modified Pfannenstiel incision) along the preoperative mark was made below the pubic hairline. The abdominal fascia was opened transversely to a width of 5–6 cm. Second, the self-retaining retractor was replaced with small Deaver retractors (width 2.5 cm) or thyroid retractors (width 1.5 cm). The small end of the abdominal retractor (width 3 cm) was inserted only slightly into the wound. During dissection, the instrument, the Backhaus towel clamp (Robbins Instruments Inc, Chatham, NJ), was applied for traction of the fibroid toward the incision wound. Third, removal of the intact fibroid was not as easy as in conventional laparotomy. Larger fibroids were pared piece-by-piece through a smaller wound [29–31]. The combination waste vent (CWV) drain was placed in the cul-de-sac region and pulled out from the wound in the left lower abdominal region. Then, the CWV drain was fixed on the abdominal wall.

### Laparoscopic myomectomy

A 10-mm port was inserted through the umbilicus to introduce the video-laparoscopic system and pneumoperitoneum was established. Another three accessory 5-mm trocars were inserted into the abdomen in the left lower quadrant, right lower quadrant, and suprapubic area for operative instruments and in the suction irrigator for the cannula. The fibroid was grasped and pulled with a second needle to infiltrate Pitressin. Next, we incised the myometrium and removed fibroids. After that step, we extended the wound over the left lower quadrant up to 1.2 cm for insertion of an electronic morcellator (Karl Storz, Tuttlingen, Germany). Fibroids were removed using the morcellator. The myometrial defects were repaired through a standard laparoscopic suture with 1-0 and 2-0 vicryl, and bleeding of the uterus was later checked. The CWV drain was placed in the cul-de-sac region and pulled out from the wound in the left lower abdominal region. Next, the CWV drain was fixed on the abdominal wall. After completing this procedure, the CO<sub>2</sub> insufflator and video laparoscopic system were turned off temporarily.

### Evaluation parameters

The parameters we considered for comparing the 2 groups were the characteristics of the uterine fibroids, surgical parameters, morbidities, and outcomes. Surgical parameters included the operative time (minutes), estimated blood loss (milliliters), time for removal of drainage, percentage of blood transfusion and comorbidities. Co-morbidities included percentage of febrile morbidity (body temperature  $>37.5$  °C), maximal temperature, duration of febrile morbidity, and percentage of paralytic ileus, hospital stay (days), visual analog scale scores, postoperative use of analgesics, and accumulative dosage of meperidine hydrochloride. The outcome evaluation primarily focused on recurrence, either the occurrence of symptoms or detection of any uterine fibroids. The parameters, including recurrence rate, interval between operation and detection of recurrence, number, maximal size, and location, were recorded. Recurrence was defined as any detected tumor with a minimal diameter  $>1$  cm after operation.

All patients received  $>4$  semiannual follow-ups and were subsequently followed up annually or when symptoms or signs

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