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Original article

Laparoscopic myomectomy instead of hysteroscopic myomectomy for large submucous fibroids

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ABSTRACT

Objective: To evaluate the efficacy of laparoscopy in treating large submucous fibroids with deeply intramural invasion.
Study design: Twenty-eight women with a main submucous fibroid >4 cm and with >50% intramural extension were enrolled in this study. Laparoscopic myomectomy was performed instead of hysteroscopic surgery.
Results: Median fibroid diameter and weight were 5.0 cm [interquartile range (IQR) 4.6–6.0 cm] and 50.0 g (IQR 36.3–77.5 g), respectively. Median operating time was 60 minutes (IQR 50.0–73.8 minutes) and blood loss was 50 mL (IQR 50–100 mL). Median postoperative hospital stay was 2 days (IQR 2–3 days) and no patient developed complications. Seven women had coexistence of intramural and/or subserosal fibroids (median number of fibroids removed was 1, IQR 1–2).
Conclusion: When the diagnosis of submucous fibroid >4 cm with >50% intramural extension is made, laparoscopic myomectomy can be performed instead of hysteroscopic surgery for the sake of safety and removal of nonsubmucous type fibroids concomitantly.
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Introduction

Uterine fibroids are common, benign uterine neoplasia and are clinically apparent in approximately 25% of reproductive-age women.[1] Fibroids are often described according to their locations in the uterus: intramural, subserosal, or submucosal. Submucous fibroids can induce severe clinical symptoms, even when small. Menorrhagia, subsequent anemia, and even infertility are common.[2–4] With the advent of hysteroscopic surgery, in these cases, a hysteroscopic myomectomy is a therapeutic option for treatment of submucous fibroids with uterine preservation.[5,6]

Surgical difficulty depends on tumor size and location. Hysteroscopic myomectomy for submucous fibroids with intramural extension >50% associated with longer operation time and elevated surgical complications.[7,8] Although there are published studies of one-step hysteroscopic surgery for this kind of tumor,[9,10] transcervical resection of fibroids with deeply intramural extension is still only considered in selected patients.[7] A major concern is that complete hysteroscopic resection might result in uterine perforation and fluid overload. Therefore, second or even third resection was necessary to complete the surgery.[7,9,11]

With the objective of diminishing surgical complications of hysteroscopic myomectomy for large deeply intramurally extending submucous fibroid and facilitating surgeons to accomplish surgery in one attempt, we propose using laparoscopy instead of hysteroscopy to treat large deeply intramural extension submucous fibroid. With this technique, surgeons can remove large submucous fibroids without the risk of water intoxication and remove nonsubmucous type fibroids concomitantly.

Materials and methods

This prospective study consisted of 28 women (age range 25–52 years, median 39 years) who complained of persistent menorrhea possibly due to a submucous fibroid. We limited the diameter of fibroids to >4 cm and intramural extension of fibroid to >50% for laparoscopic myomectomy. Prior to the operation, the patients were informed of the risks and benefits of laparoscopic myomectomy, including the potential need to switch to laparotomy during the operation and the risks of intraoperative bleeding, transfusion, and adhesion. Written informed consent was obtained from all patients.

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Prior to the surgery, all patients underwent preoperative assessments, including detailed medical history, pelvic examination, ultrasonography, and official diagnostic hysteroscopy.

The operations were performed by one of the authors (C.J.W.) at Chang Gung Memorial Hospital. The procedure was conducted with the patient in the dorsolithotomy Trendelenburg position with both legs protected by elastic bandages; a Foley catheter was inserted for constant urinary drainage. A uterine manipulator was placed into the uterus (if the woman had prior sexual activity). Videolaparoscopy was performed with a 5-mm principal trocar introduced through the umbilicus. Two ancillary cannulas were placed under laparoscopic visualization: one 5-mm cannula in the right lower quadrant lateral to the inferior epigastric arteries and one 5-mm cannula in the left lower quadrant. If more portal sites were needed, other cannulas were introduced at the paramedian line, just above the pubic hairline. Once cannula placement was complete, adhesions were lysed as necessary.

After identifying the location of all fibroids, a transverse incision was made on the serosa overlying the fibroid using a unipolar electrode. The incision was extended into the pseudocapsule down to the characteristically pearly white substance of the tumor. Additional fibroids located at the same area were removed through the same incision. However, for nonadjacent fibroids, creating a new incision was necessary. A myoma screw or second puncture was then inserted into the fibroid to apply traction while a probe (or any instrument that functions as a probe) was used to dissect bluntly in the cleavage plane to leverage the tumor against the uterine wall and pry it out of its bed. The unipolar electrode was used to dissect pseudocapsule attachments further. Vessels were electrocoagulated by Kleppinger forceps, Richard Wolf, Rosemont, IL prior to being cut. After fibroid removal, the uterine defect was irrigated. Bleeding points were identified and controlled with electrocoagulation.

The uterine surgical defect was closed in layers. If excessive myometrium and serosa were present, these were trimmed off. Using a 0 monofilament poliglecaprone 25 (Monocryl; Ethicon Inc, Somerville, NJ, USA) on a large curved needle to make a deep and wide (1 cm from the cut edge of the incision) bite. An original 90 cm suture line would be trimmed to 25 cm long for the sake of carrying out continuous suturing inside the peritoneal cavity freely. Entering the uterus with a needle through the serosa to the myoma bed and emerging at the superficial level in a U shape, the needle was then grasped and reapplied in a reverse fashion. Intracorporeal knot tying was used at that time. A continuous non–running-lock suture with 1-cm increments was then carried out, with each suture penetrating the full thickness of the myometrium, following a method similar to that applied during laparotomy.

Specimens were removed through posterior colpotomy; a wet sponge on ring forceps was inserted behind the cervix to distend the top of the posterior vagina. Unipolar scissors were used to make a transverse colpotomy incision. Excised fibroids were stored in the posterior cul-de-sac. After completing these procedures, the CO_2 insufflator and videolaparoscopic system were turned off temporarily, after which the colpotomy incision was extended laterally by digital pressure. A long Heaney retractor, Surgipro, Shawnee, KS was placed into the posterior cul-de-sac, where it was used to depress the rectum. The fibroids were then grasped directly with a tenaculum. Medium and large fibroids were morcellated with a scalpel or scissors so that they could be removed from the pelvis. After removal of all fibroids, the colpotomy incision was closed with 2-0 polyglycolic acid suture. Pneumoperitoneum was re-established at this time, and the peritoneal cavity was irrigated and lavaged until fluid was clear. If the specimen had to be removed from the abdominal wall, a 15-mm electro-mechanical morcellator (Gynecare, Somerville, NJ, USA) was used to ease extraction of the specimen. All port sites were sutured with 3-0 polyglycolic acid suture at the level of the fascia to prevent herniation. The skin was approximated by sterile adhesive tape.

All samples were sent to pathology. Patients were seen at 1 week, 3 months, and 6 months postoperatively. A control hysteroscopy was performed in the office 1 month after surgery for those women whose uterine cavity was broken during the operation.

Results

In the 28 women, 11 submucous fibroids were located in the anterior wall, six in the fundus, and 11 in the posterior wall. All lesions were sessile with intracavitary protrusion <50%. The median diameter and weight of the fibroids were 5.0 cm [interquartile range (IQR) 4.6–6.0 cm] and 50 g (IQR 36.3–77.5 g), respectively. Seven women had more than one fibroid and median number of fibroid removed was one (IQR 1–2). All fibroids were removed in one procedure. Median operating time and amount of blood loss were 60 minutes (IQR 50.0–73.8 minutes) and 50 mL (IQR 50–100 mL), respectively. Postoperative hospital stay was 2 days (IQR 2–3 days; Table 1). No major complications, such as ureter, bladder, or bowel injuries, occurred in any of the cases, and no patient required laparotomy or blood transfusion during or after surgery.

Histologic examination of the resected tissue showed leiomyomatous tissue in all patients. Three specimens had hyaline degeneration. No sarcomatous change was observed. Five women had uterine cavity broken during operation and control hysteroscopy showed no intrauterine adhesion. Menstrual bleeding problems were controlled in 27 (96.4%) women after 6 months of follow-up.

Discussion

Laparotomy, laparoscopy, and hysteroscopy are the three main procedures employed by gynecologists to remove uterine fibroids. The abdominal approach (laparotomy and laparoscopy) is used to treat subserousal and intramural lesions, and the vaginal approach (hysteroscopy) is used for submucous fibroids. With the advent of hysteroscopic surgery, operative hysteroscopies can manage most intrauterine surgical problems with fast recovery. However, hysteroscopic myomectomy for large deeply intramural extension submucous fibroid is still deemed a challenge for hysteroscopists. It involves issues of longer operating time, fluid overload, uterine perforation, and incomplete resection in one surgery.

Although one-step hysteroscopic myomectomy has been described elsewhere,[9,10] complications with uterine perforation still occurred and a second operation was sometimes required.[9] The

Table 1
Patient characteristics ($n = 28$).

Variable	Value
Age (y)	39 (34–41.75)
Body mass index (kg/m^2)	22.53 (20.7–25.31)
Parity	
Nulliparous	5 (17.9)
Multiparous	23 (82.1)
Wall where fibroid originated	
Anterior	11 (39.3)
Posterior	11 (39.3)
Fundus	6 (21.4)
Diameter of fibroid (cm)	5.0 (4.63–6.0)
Fibroid weight (g)	50 (36.25–77.5)
Fibroids removed. No.	1 (1.0–2.0)
Operating time (min)	60.0 (50.0–73.75)
Blood loss (mL)	50 (50–100)
Postoperative stay (d)	2 (2–3)

Values are median (interquartile range) or *n* (%).

described procedures involved the use of resectoscopy and myoma grasper concomitantly. If the tissue between fibroid and uterine serosa was too thin, the manipulation of myoma grasper might cause uterine perforation. Laparotomy or laparoscopy intervention is required to correct the uterine defect. Therefore, the procedure was suggested not to be performed when the intramural part of the fibroid is $>$ 4 cm in diameter and myometrial thickness at the implantation site is $<$5 mm.[12]

The intrauterine location of submucous fibroid is also a major factor in deciding if the operation can be completed by hysteroscopy or not. When a large sessile fundal fibroid exists, it is sometimes inaccessible by the resectoscope due to the designed nature of the instrument itself. Therefore, partial resection of fibroids can be performed and repeated surgeries might be necessary. Transabdominal myomectomy instead of hysteroscopy is the definite manner to remove fibroids in this situation.

The advantages of conservative treatment should be weighed against the risk of future additional surgery. Hysteroscopy can remove most submucous fibroids in selected patients. However, if intramural and subserosal fibroids are present, it is impossible to resect the entire fibroids via hysteroscopy and the uterus will not have normal anatomy after the operation. Thus, the symptoms induced by fibroids might persist and additional surgery is required for the resolution of problems. Laparoscopic myomectomy is a mature surgical technique utilized by gynecologists for patients meeting the treatment criteria even for large intramural fibroids.[13] Using laparoscopy in treating large submucous fibroids can avoid the above mentioned issues and remove all fibroids simultaneously.

In conclusion, even hysteroscopic myomectomy offers several benefits to the patient. We must bear in mind that hysteroscopic removal of large deeply intramural invasion submucous fibroids is still a technically challenging procedure and might be associated with higher surgical morbidity and incidence of additional surgery. To avoid these tough situations, the vaginal approach should be shifted to the abdominal approach with laparoscopy, which can remove fibroids and still meet the principle of minimally invasive surgery; however, this particular approach should be performed only by those surgeons who are skilled in laparoscopic suturing.

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