Review Article

Myomectomy: Choosing the Surgical Approach – A Systematic Review

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Abstract

Myomectomy has evolved from open laparotomy to laparoscopy, hysteroscopy, VNOTES and robotic myomectomy. The surgical approach in doing myomectomy depends on the type and location of the myoma and the surgeon's expertise. Minimally invasive surgery has been the preferred approach due to the benefit of shorter hospital stay, lesser postoperative pain, earlier recovery, minimal blood loss and the cosmetic appearance of the scar. The success of this procedure depends on the incision technique, enucleation, and blood loss prevention by using hemostatic techniques and suturing techniques. Performing myomectomy for a large uterine myoma is a laparoscopic challenge; however, with the use of Lee-Huang point (midpoint between umbilicus and xiphoid) as the primary insertion and camera port, one can easily navigate thru the abdominal cavity in case the uterus is huge obscuring the umbilical port. Laparoscopic Myomectomy can be safely and efficiently performed by experienced laparoscopic surgeons regardless of myoma size, number and location. Removal of large myoma specimen from the abdominal cavity through the laparoscope became a challenge after the use of power morcellator was abandoned. To overcome this problem, the large myoma is placed inside an Endo bag and its edges brought extracorporeally through the port site. The myoma is incised in a C-manner using a scalpel to reduce the size. Myoma can also be removed using in-bag power morcellation. Fertility preservation is the long-term aim of doing myomectomy instead of hysterectomy in the management of leiomyoma aside from alleviating symptoms of abnormal uterine bleeding, urinary frequency and abdominal pain.

Keywords: Abdominal myomectomy, hysteroscopic myomectomy, laparoscopic myomectomy, leiomyoma, robotic myomectomy, vaginal natural orifice transluminal endoscopic surgery myomectomy

Introduction

Leiomyoma (commonly known as uterine fibroid) is a common gynecological condition. Recent epidemiological data estimated an astounding 70% of white women and 80% of women of African ancestry being affected during their lifetime.[1] Most women with fibroids are asymptomatic, whereas approximately 30% of them will present with a myriad of distressing symptoms, such as abnormal uterine bleeding (AUB), anemia, pelvic pain and pressure sensation, back pain, urinary frequency, constipation, or infertility, and will require treatment. Patients seeking symptom relief from pelvic pressure, AUB, urinary frequency, or abdominal pain secondary to leiomyoma or fibroids are one of the most common gynecologic consults. Most of these patients are in their reproductive years. Some patients seek consultation for infertility and were noted to have incidental findings of leiomyoma on transvaginal ultrasound. In patients who have completed family and do not desire future fertility, hysterectomy is offered to them for symptomatic cure; however, for patients who are desirous of future pregnancy,

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myomectomy remains the best surgical option when medical management or the recently introduced high-intensity focused ultrasound ablation is contraindicated in the patient.

Myomectomy as a procedure was successfully performed by Amussat in 1840 for a large pedunculated myoma initially thought to be an ovarian tumor. The first scientific report of a uterus-conserving myomectomy through the vagina appeared in 1845 in the *American Journal of the Medical Science*, published by Washington Atlee, in Pennsylvania.[2] Alexander Adam in 1898 described 11 cases of abdominal myomectomy (AM) of other variations of myoma besides pedunculated myoma; however, this was met by hostility and was not acceptable to gynecologists at that time. It was only in 1922 when Victor Bonney, an English surgeon who evaluated the works of Adam and his predecessors and proposed a conservative approach, developed a uterine artery clamp that allowed for a substantially less morbid procedure with decreased intraoperative bleeding. He went on to perform over 700 myomectomies with only 8 reported deaths. In the 1930s, William J. Mayo from the USA also supported the notion of conservative surgery on the uterus by means of myomectomy for fertility reasons.[3,4] As with all significant strides in the surgical field, almost a century was needed to debunk the original stigma of myomectomy. The development of minimally invasive surgery would shift this paradigm dramatically with the evolution from abdominal, vaginal, and laparoscopic to vaginal natural orifice transluminal endoscopic surgery (vNOTES) and robotics. Specially designed robotic systems for the sole purpose of single port or vNOTES myomectomy are also developed. In this article, the different surgical approaches to myomectomy will be elucidated.

Methods

A systematic review on published studies in PubMed, Science Direct, Google Scholar, and Cochrane was performed. Myomectomy, approach to myomectomy, myomectomy techniques, laparoscopic myomectomy (LM), hysteroscopic myomectomy, robotic myomectomy, vNOTES myomectomy, and AM were the keywords to isolate the relevant studies.

Discussion

Abdominal myomectomy

This procedure was the earliest performed in the surgical management of myoma in patients who are desirous of future pregnancy. This procedure involves laparotomy to gain access to the uterus and myoma. This technique is employed as a standard in the early days of myoma surgery. The choice of skin incision varies depending on the situations and the determining factor largely related to fibroid size: in patients where the myoma is very big obstructing the use of laparoscopic trocars and all the multiple myomas cannot be removed totally without the aid of intraoperative palpation as tactile feedback is limited in laparoscopy/minimally invasive surgery. One alternative to palpation would be to accurately map the fibroids by means of magnetic resonance imaging (MRI) before the Minimally Invasive Surgery (MIS) approach. This would then overcome the problem of incomplete removal of multiple uterine myomas as MRI mapping is efficient for mapping of fibroid location, type, and the International Federation of Gynecology and Obstetrics (FIGO) class.[5] The noted disadvantages of the laparotomy are as follows: the presence of a large wound, more postoperative pain and analgesia requirement, longer hospital stay, more postoperative adhesion formation, and not a minimally invasive procedure.

Uterine incision to remove the myoma can either be transverse or longitudinal. A randomized controlled trial by Elguindy *et al*. compared the two incisions with regard to bleeding during myomectomy. No statistically significant difference was found between transverse and longitudinal incisions regarding intraoperative blood loss, operative time, and postoperative fever. The study concluded that transverse uterine incision does not cause more blood loss than longitudinal incision and is a reasonable option during AM.[6]

Hysteroscopic myomectomy

FIGO submucous type 0–1 and <3 cm type 2 are better managed with hysteroscopic myomectomy. The two techniques in hysteroscopic myomectomy are the enucleation technique and the slicing technique. The enucleation technique is classified as either Mazzon technique (1995) or Lasmar technique. The Mazzon technique involves fragmenting the fibroid until it reaches the intramural portion and mobilizes it using a "cold loop." In contrast, the Lasmar technique entails incising the endometrium around the submucosal myoma until the pseudocapsule is reached. The technique in slicing the myoma involves fragmenting it, starting from the surface until reaching the base.[7]

Transcervical resection of myoma (TCR-M) can be done under direct transcervical resectoscope observation or under transabdominal guidance.[8] The resectoscope generally employs a bipolar energy, but monopolar devices are available as well. The advantages of TCR-M type 0–2 over transabdominal surgery are as follows: (a) shorter operating time and hospital stay, (b) quicker recovery, (c) earlier return to work, and (d) less painful for patients.[9]

In recent years, hysteroscopic morcellation using the Intrauterine Bigatti Shaver (IBS) has gained popularity. This is because, similar to power morcellation in abdominal

hysterectomy by MIS, such hysteroscopic morcellation devices employ a miniature double-window morcellation blade through the rigid shaving system of the hysteroscope and thus reduce the risk of energy device-related complications. In such techniques, the IBS or morcellation blade rotates at the tip and with gradual suction pressure applies traction of the myoma lesion into it and gradually removes the lesion piece by piece and can achieve complete resection. The disadvantages associated with this technique are such as: not suitable for FIGO myoma lesions that are totally intramural, i.e. type 3 and above. Newer devices are becoming smaller in size from 21 Fr to 19 Fr, and a newer bipolar hemostatic device has also been added to the IBS armamentarium.[10,11]

Some of the case reports suggest that abnormal placentation, i.e. placenta accreta, was noted to occur after TCR-M. This is, however, not conclusively linked to the procedure and should be viewed with caution. Other common disadvantages of the hysteroscopic route include uterine perforation, water intoxication, and bowel injury; however, this can be reduced by employing the hysteroscopic morcellation technique as opposed to the conventional use of monopolar/bipolar energy.[10-12]

Laparoscopic myomectomy

LM over the years has replaced open surgery as the new standard in the removal of uterine leiomyomas.[13-15] Many studies have shown that performing LM produced lesser postoperative pain, lesser hospital stay, and more cosmetic appearance of scar.

The success of this procedure depends largely on the surgical technique: incision choices, enucleation, and blood loss reduction by employing hemostatic techniques as well as suturing techniques. The success of this procedure depends largely on surgeon experience, as well as surgical technique: incision choices, enucleation, and blood loss reduction thru hemostatic and suturing techniques. These are crucial to ensure the success of the procedure thus reducing subsequent conversion to laparotomy.

Uterine incisions for myomectomy can be transverse or longitudinal. Andou *et al*. described their technique for myomectomy. The needle driver is placed into the median port. Method of choice is the longitudinal incision as it is easier to manipulate the needle driver than with the transverse incision. The incision can be applied at any point and the suturing can be applied in the same way at every point. For a parallel ipsilateral port configuration, the transverse incision is the preferred technique as suturing can be performed easily. To incise the myometrium, they use a harmonic scalpel or monopolar cautery (pure cutting mode: 70 Watt). Thermal spread to the myometrium can be avoided by cutting quickly. In the case of subserosal myomas, they remove the ship-shaped segment of the myometrium to reduce the amount of excess serosa. Finding the appropriate plane to determine the depth of incision is of prime importance. It is better to cut into the fibroid and then find the dissectible plane, rather than make a cut that is too shallow.[16]

Enucleation of myoma can be done by grasping it with a laparoscopic tenaculum or using a myoma screw to aid in peeling the myometrium/serosa. A bipolar vessel sealing device such as the LigaSure™ can be used in cutting thick fibrous tissue as well as to coagulate bleeding vessels, whereas a suction tubing can be used to easily peel off thin fibrous tissue around the myoma.

Blood loss during myomectomy can be achieved by injecting diluted vasopressin between the myoma capsule and normal uterine muscle through the suprapubic abdominal wall using a laparoscopic needle or a spinal needle. Laparoscopic aspiration needle passed through laparoscopic cannulas and introducing diluted vasopressin into the target organ is also common.

Uterine artery occlusion during myomectomy is associated with decreased surgical blood loss and transfusion rate compared with control patients.[17] Uterine artery occlusion can be achieved by dissecting the Cheng's triangle region bounded by the external iliac blood vessels, the round ligament, and the infundibulopelvic ligament. The peritoneum is opened exposing the ureter and the internal iliac artery, then separating and ligating the uterine artery.[18] Laparoscopic triple tourniquet can be employed as follows: the first tourniquet called isthmic tourniquet or Hangman's tourniquet can be achieved by introducing Monocryl 1 from the suprapubic area extracorporeally; then, the needle is driven through the avascular zones of broad ligaments at the isthmic level and with a sliding tie made anteriorly to the uterus. This is tightened by manually tensioning the suture extracorporeally and pushing the knot intracorporeally. The second and third tourniquet is through the bilateral infundibulopelvic tourniquet using Monocryl 1. The tourniquets are removed after the enucleation of the myoma and repair of the uterine incision.[19]

Figure 1: Manual morcellation of myoma

Removal of large myoma specimen from the abdominal cavity through the laparoscope became a challenge after the use of power morcellator was abandoned. To overcome this problem, the large myoma is placed inside an Endo bag and its edges are brought extracorporeally through the port site. The myoma is incised in a C-manner using a scalpel to reduce the size [Figure 1]. Zullo *et al* conducted a meta-analysis to evaluate the effectiveness and safety of protected in-bag extracorporeal manual morcellation during laparoscopic myomectomy compared to intra-abdominal uncontained power morcellation in terms of accidental morcellation of the liver, conversion to laparotomy, endoscopic bag disruption, bowel injury, bleeding, accidental injury to any viscus or vessel but found limited evidence hence suggested for larger and multi-center study.[13] In general, careful preoperative patient selection to rule out incidental leiomyosarcoma in cases of uterine fibroid will allow a safe and successful myomectomy and in-bag power morcellation procedure. This includes endometrial biopsy and cervical cytology to exclude coexisting uterine or cervical malignancy. Leiomyosarcomas are more difficult to detect preoperatively, although 38%–68% of leiomyosarcomas can be detected in this manner. MRI may also be useful in determining which masses represent benign uterine fibroids and are safe for power morcellation. Thus, AAGL suggested to improve but not abandon power morcellation and that power morcellation with appropriate informed consent should remain available to appropriately screened women at low risk.[20]

Performing myomectomy for a large uterine myoma is a laparoscopic challenge; however, with the use of Lee–Huang (LH) point (midpoint between umbilicus and xiphoid) as the primary insertion and camera port, one can easily navigate through the abdominal cavity in case the uterus is huge obscuring the umbilical port. The steps for LM are presented in Table 1. The LH point allows for a greater panoramic view from above, especially for cases of uterine fibroids that are large and obstruct umbilical access at about 20-week size. This is also a relative avascular and aneural site where bleeding is anticipated to be minimal and trauma to neurovascular structures minimized.[21]

Table 1: Steps for laparoscopic myomectomy

Localization
Control of hemorrhage
Diluted vasopressin injection to the subserosal layer overlying myoma and/or
Application of triple tourniquet to uterus
Transverse incision on the myoma plane
Enucleation
Closure of uterine defect in layers
Specimen retrieval by manual morcellation
Application of anti-adhesion barrier

Robotic myomectomy

The development of robotic surgery was noted to improve dexterity and increased degree of freedom, improved hand-eye coordination due to three-dimensional visualization, and reduction in positional fatigue among surgeons.[22] The advantages of robotic-assisted myomectomy (RAM) over AM and LM have been established in many studies. Aside from decreasing surgeon's fatigue due to prolonged standing from difficult surgeries, finer suturing and dissection of poorly accessible tissues were observed.[23] In a meta-analysis done by Wang *et al*. comparing RAM versus LM and AM in the treatment of uterine fibroids, the results of the study show that RAM, compared with LM and AM, is associated with significantly fewer complications, significantly lower estimated blood loss, significantly fewer conversions than both LM and AM, significantly less bleeding than LM, and significantly lower maximum postoperative pain score than AM.[24] The advantages of robotic assisted myomectomy (RAM) over abdominal myomectomy (AM) and laparoscopic myomectomy (LM) have been established in many studies. Aside from decreasing surgeon's fatigue due to prolonged standing from difficult surgeries, finer suturing and dissection of poorly accessible tissues were observed. The disadvantages of using robotic myomectomy includes the cost of installation, bulky machinery, staff training, longer preparation time, and cost of surgery are the limiting factor in doing robotic myomectomy.[23] In a meta-analysis done by Wang et al. comparing robotic assisted versus laparoscopic and abdominal myomectomy in the treatment of uterine fibroids, results of the study show that RAM, compared with LM and AM, is associated with significantly fewer complications, significantly lower estimated blood loss, significantly fewer conversions than both LM and AM, significantly less bleeding than LM, and significantly lower maximum postoperative pain score than AM.[24] The advantages still outweigh this hindrance. Robotic surgery is becoming more widely accepted with newer devices and a greater adoption rate worldwide.

Vaginal natural orifice transluminal endoscopic surgery myomectomy

The development of vNOTES in the field of gynecology has progressed from laparoscopic vNOTES to robotic vNOTES. The advantage of performing vNOTES myomectomy entails the absence of abdominal wound, shorter postoperative hospital stay, lesser postoperative pain, decreased incidence of bowel injury in trocar insertion, and esthetic outcome.[25-27] Limitations in performing vNOTES myomectomy include: a) inadequate surgical space, and b) massive pelvic adhesions secondary to pelvic inflammatory disease, deep infiltrating endometriosis, and previous pelvic surgery. Myoma types 3–7 are usually removed by laparotomy, laparoscopic, and

robotic myomectomy. A step-wise technique was described by Baekelandt whereby myoma types 3–7 can be removed through vNOTES myomectomy.[28] In the technique described, a posterior myoma can be managed by doing a posterior colpotomy, opening the pouch of Douglas, and inserting a vNOTES port transvaginally. In the case of an anterior myoma, an anterior colpotomy is done and the peritoneum is opened between uterus and bladder. Once pneumoperitoneum is achieved, the endoscopic instruments and endoscope are inserted through the vNOTES port and the myoma is identified. Incision, enucleation of the myoma, hemostasis, and subsequent suturing of uterine defect are then carried out. The specimen is placed in an Endo bag and removed through the colpotomy. The colpotomy is subsequently sutured using an absorbable suture.

Robotic vNOTES myomectomy was also performed and described in one article whereby posterior colpotomy was done, a gel port was inserted, a da Vinci robot was docked, and an 8 cm posterior myoma was removed; the uterine defect was subsequently sutured and the myoma was morcellated extracorporeally using the C-incision technique through the colpotomy. The posterior colpotomy was closed after hemostasis.[29] VNOTES surgery combines the superiority of nonscar abdominal approach (as all the procedures are being done through the vagina) and faster return to normal activities and better quality of life observed in conventional vaginal surgery.[30,31]

Comparative Studies of the Different Myomectomy Approaches

Many studies were done comparing the intraoperative and postoperative outcomes of the different myomectomy techniques as to operating time, blood loss, myoma size, and hospital stay. Recent studies published online from January 1, 2016, to June 31, 2023, are summarized in Table 2.

Myomectomy in correlation with size, number, and location of myoma

LM can be safely and efficiently performed by experienced laparoscopic surgeons regardless of myoma size, number, and location.[38,39]

Myomectomy with deep infiltrating endometriosis

A nationwide cohort study performed in Taiwan studied the association between leiomyoma and increased risk of endometriosis. The study concluded that women with leiomyoma have an increased risk of developing endometriosis. This may be attributed to the fact that uterine leiomyoma and endometriosis are both hormone dependent and share common symptoms such as pelvic pain, AUB, and subfertility.[40] In performing myomectomy, the surgeon and the patient must be prepared that patients will have coexisting deep infiltrating endometriosis; hence, laparoscopic or robotic myomectomy as well as radical surgery for deep infiltrating endometriosis must be performed.

Risk of rupture after myomectomy

The risk of uterine rupture after myomectomy whether laparotomic, laparoscopic, or hysteroscopic was noted to be low.[41] In a retrospective study done by Gil et al, odds ratio of uterine rupture post myomectomy is 0.43%, wherein ruptures post-laparotomy myomectomy was noted to occur at 4.2 per 1000 cases, compared to 10.6 occurences per 1000 laparoscopic procedures.[42]

Conclusion

Conclusions derived in this study is two-fold. First, fertility preservation is the long-term aim of doing myomectomy instead of hysterectomy in the management of leiomyoma aside from alleviating symptoms of abnormal uterine bleeding, urinary frequency and abdominal pain. The long-term clinical outcomes such as improved fertility and postoperative quality of life after doing minimally invasive surgery for myomectomy are still to be verified with clinical trials. Second, the learning curve for the different approaches from open myomectomy to robotic myomectomy is a great challenge for every gynecologist. This is because conventional residency training in obstetrics and gynecology (Ob-Gyn) does not routinely incorporate a minimally invasive surgical approach due to cost constraints, lack of facility, and lack of qualified trainers in the field. Organizations such as the AAGL, ESGE and APAGE-MIT have proposed standardized fellowship training in minimally invasive surgery, and this will help address the lack of Minimally Invasive Surgery (MIS) component in residency training for Ob-Gyn. With increased patient awareness, the need and demand for minimally invasive approach to myomectomy also increases. It is paramount, therefore, to advocate standardized surgical training and to ensure that gynecologists are well trained to perform this essential surgical procedure in daily practice.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Author contributions

JSP: Drafting the article and revising it critically for important intellectual content, acquisition of data and interpretation of data.

Table 2: Comparative studies of the different myomectomy approaches

Author/type of study	Myomectomy approach	Sample size (*n*)	Operative time (min), mean±SD	Blood loss (mL), mean±SD	Hospital stay (days), *n* (%)	Largest size of myoma (cm), mean±SD	Findings
Takmaz *et al.*[32] Prospective nonrandomized trial	LM versus RM	LM: 33 RM: 31 n: 64	LM: 127±20 RM: 137±27 *P*: 0.29	LM: 138±53 RM: 160±62 *P*: 0.28	LM: 17 (51.5) - 1 day, 15 (45.4) - 2 days, 1 (3) - 3 days RM: 20 (64.5) - 1 day, 10 (32.2) - 2 days, 1 (3.2) - 3 days *P*: 0.40	LM: 6.5±1.4 RM: 6.8±1.1 *P*: 0.32	No significant difference in the perioperative outcome
Kotani *et al.*[33] Retrospective study	LM versus AM	LM: 474 AM: 279 *n*: 753	LM: 148±58 (53–422) AM: 127±48 (25–315) *P*<0.001	LM: 207±225 (9–1325 AM: 554±536 (34–2875) *P*<0.001	LM: 3.5±1.8 (2–17) AM: 11.7±3.9 (3–36) *P*<0.001	LM: 7.0±2.6 (1.0–20.0) AM: 9.0±4.6 (1.0–30.0) *P*<0.001	LM is the preferred option from the perspective of postoperative adhesion, less blood loss, less hospital stay
Wang *et al.*[34] Retrospective study	LM versus HM Group A: ≤3 cm Group B: <4 cm Group C: ≤4–<5 cm	LM: 45 HM: 40 *n*: 85	LM Group A - 59.46±18.23 Group B - 56.74±10.23 Group C - 62.46±10.65 *P*: 0.7573 HM Group A - 45.66±13.31 Group B - 65.67±20.32 Group C - 76.24±16.73 *P*: 0.0003	LM Group A - 64.65±25.33 Group B - 74.47±44.78 Group C - 76.43±42.5 *P*: 0.5940 HM Group A - 42.23±23.21 Group B - 95.54±33.32 Group C - 105.25±32.87 *P*: 0.0000	LM Group A -5.10±1.20 Group B - 5.43±1.19 Group C- 5.33±1.47 *P*: 0.8202 HM Group A - 3.12±1.20 Group B - 3.23±1.11 Group C - 3.45±1.42 *P*: 0.8035	LM: 4.13±0.87 HM: 4.04±0.96 *P*: 0.65	Both LM and HM are feasible for type 2 myoma measuring 3–5 cm. Type 2 myoma measuring >4 cm is better managed with LM but myoma <4 cm is better managed with HM
Lee *et al.*[35] Retrospective study	RM	*n*: 242	155.29±63.51 min	384.33±659.86 mL	2 days	9 cm	The number of myomas (5–9 or ≥10) affects both EBL >320 mL and total OT >3 h, and the maximal myoma diameter and history of abdominal surgery other than cesarean section affect the EBL but not the total OT in multiport RM
Jansen *et al.* (2019)[36] Retrospective cohort study	AM versus LM versus RM	AM: 311 LM: 185 RM: 163 *n*: 659	AM: 147.4±51.9 LM: 153.7±62.6 RM: 239.7±55.8 *P*<0.001	AM: 304.1±383.9 LM: 345.7±479.6 RM: 262.2±205.6 *P*: 0.127	AM: 2.2±0.9 LM: 0.6±1.3 RM: 0.7±0.9 *P*<9.001	AM: 9.5±4.1 LM: 10.2±3.7 RM: 9.0±3.4 *P*: 0.013	Preference for AM or LM over RM for increased specimen weight, and a preference of AM over LM or RM when considering increased number of myomas
Hou *et al.*[37] Retrospective study	vNOTES M versus LESS M versus Multiport LM	vNOTES M: 94 LESS M: 90 Multiport LM: 93 *n*: 282	vNOTES M: 106.80±41.87 LESS M: 112.52±42.05 Multiport LM: 80.82±31.98 *P*: 0.000	vNOTES M: 78.09±106.04 LESS M: 92.22±131.05 Multiport LM: 62.37±85.53 *P*: 0.180	vNOTES M: 3.67±1.78 LESS M: 4.08±1.42 Multiport M: 4.31±1.36 *P*: 0.016	vNOTES M: 6.44±1.46 LESS M: 6.62±1.59 Multiport LM: 6.09±1.68 *P*: 0.065	vNOTES M is equally effective and safe compared to LESS and Multiport M

SD: Standard deviation, AM: Abdominal myomectomy, LM: Laparoscopic myomectomy, RM: Robotic myomectomy, vNOTES M: Vaginal natural orifice transluminal endoscopic surgery myomectomy, LESS M: Laparoendoscopic single-site surgery myomectomy, HM: Hysteroscopic myomectomy, EBL: Estimated blood loss, OT: Operation time

CLL: Concept and design of study, revising the article, final approval of the version to be published.

PTC: Revising the article critically for important intellectual content.

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Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of interest

Dr. Chyi-Long Lee , an editorial board member at Gynecology and Minimally Invasive Therapy (GMIT), had no role in the peer review process of or decision to publish this article. The other authors declared no conflicts of interest in writing this paper.

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