

A practical approach to laparoscopic myomectomy for large uterine leiomyoma – a case report

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ABSTRACT

Advancements in minimally invasive surgery have allowed uterine myomectomy to be performed laparoscopically with several well-established advantages. However, contention exists regarding the practicality of the laparoscopic approach for large uterine leiomyomas. As a result, many gynaecologists still prefer open surgery. Notwithstanding, several measures exist to combat the technical challenges of the procedure. These include manipulating port placement, the use of a laparoscopic tourniquet, and alternatives to laparoscopic power morcellation. Herein, we report a successful laparoscopic myomectomy performed in a nulliparous 33-year-old woman with a large symptomatic subserosal leiomyoma. In addition, we outline the steps and modifications to a standard laparoscopic myomectomy to facilitate the removal of a large uterine leiomyoma.

Keywords: fertility, leiomyoma, laparoscopic surgery, myomectomy, minimally invasive surgery

CASE DESCRIPTION

A 33-year-old nulliparous woman of Indo-Trinidadian descent presented to the hospital with an abdominal mass, menometrorrhagia, dysmenorrhoea, and symptomatic anaemia for several months. She gave a history of a rapid increase in abdominal distension over 2-3 months. She also reported an increased frequency of urination, lower back pain, and bloating. Her past medical, gynaecological, surgical, family, and social history was otherwise unremarkable.

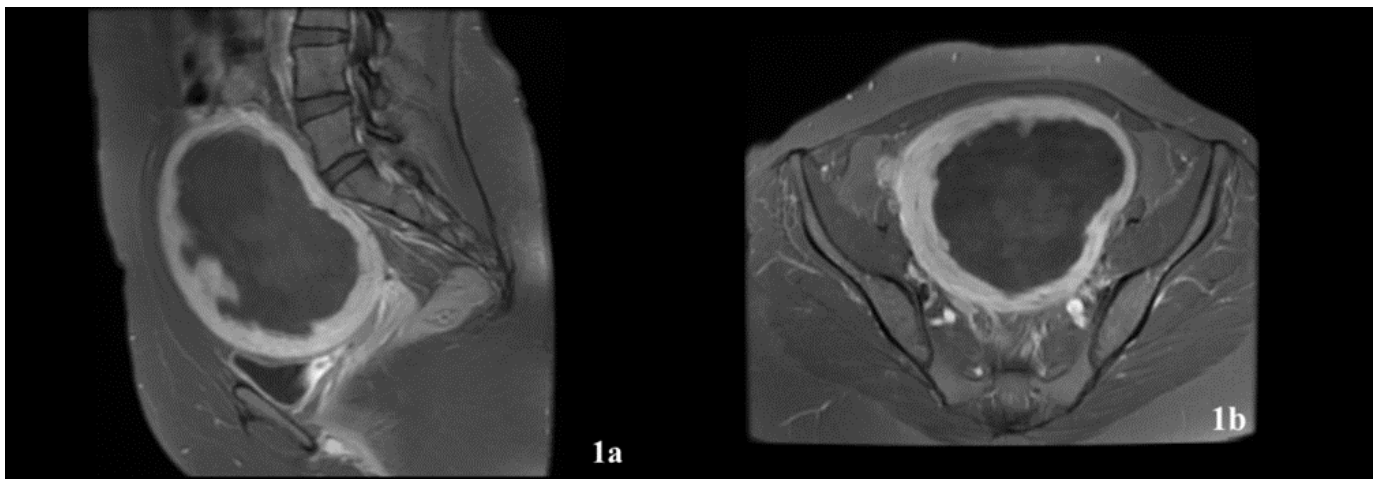
Abdominal examination revealed a firm, smooth, irregular, 16-week size abdominal mass that moved on cervical manipulation. Pelvic ultrasonography confirmed an enlarged uterus with a 12 cm × 12 cm intramural leiomyoma associated with cystic degeneration. There was no evidence of pelvic free fluid, hydronephrosis, or hydroureter. Her haemoglobin concentration was 8.5 g/dL, whilst other blood parameters were unremarkable.

Given the rapid increase in abdominal distension, pelvic magnetic resonance imaging (MRI) was requested to aid in diagnosis of leiomyosarcoma, accurately delineate uterine anatomy, and assist with management planning. Pelvic MRI (Figure 1) demonstrated a uterine size of 15.6 cm × 9.5 cm × 10.2 cm with a solitary, central cystic mass within the uterus. This cystic mass, likely a degenerated leiomyoma, measured 7.1 cm × 10.3 cm × 10.0 cm and did not enhance suspiciously on intravenous contrast administration. There was also no associated pelvic adenopathy. Treatment options were discussed with the patient. She was amenable to fertility-sparing minimally

invasive surgery and therefore opted for a laparoscopic myomectomy.

Intraoperatively, abdominal entry and pneumoperitoneum were achieved with the use of a direct optical access trocar (5 mm) placed at Palmer's point. Two 5 mm accessory ports were placed to the left of the midline, lateral to the inferior epigastric vessels and one 12 mm supraumbilical port was used to assist with uterine manipulation. Operating pressures were maintained at 8-10 mmHg. Intra-abdominal visualisation revealed an enlarged, uterus containing an anterior intramural leiomyoma with a maximum diameter of 12 cm. The adnexa, round ligaments, and intra-abdominal organs appeared unremarkable. Diluted epinephrine (1 ampoule 1 mg/mL (1:1000) diluted in 100 mL isotonic saline solution) was infiltrated along the planned serosal incision to minimise blood loss. The standard procedure for laparoscopic myomectomy was followed by a vertical incision made on the uterine serosa overlying the leiomyoma with monopolar scissors. A laparoscopic myoma screw was used to apply traction to the leiomyoma and the cleavage planes were dissected. The leiomyoma was enucleated from the myometrium without incidental entry into the endometrial cavity. The myometrial defect was closed in haemostatic layers using a delayed-absorbable barbed suture. The specimen was then placed in an endoscopic retrieval bag and the open end of the endoscopic bag was exteriorized through the 12 mm supraumbilical port. The specimen was sharply dissected within the endoscopic bag and extracted. Estimated blood loss was 300 ml and operative time was 160 minutes.

Figure 1: MRI pelvis sagittal (1a) and axial (1b) view showing a moderately enlarged uterus 15.6 cm × 9.5 cm × 10.2 cm and a central subserosal leiomyoma with cystic degeneration 7.1 cm × 10.3 cm × 10.0 cm



The patient’s postoperative course was unremarkable, and she was subsequently discharged from the hospital one day later. At the follow-up visit 10 days and 6 weeks later, the patient was well with no postoperative complications.

DISCUSSION

Uterine leiomyomas are the most common benign tumours of the female genital tract.¹ They are oestrogen-dependent tumours that arise from the clonal proliferation of a single smooth muscle cell.² Uterine leiomyomas may be classified as submucosal, intramural or subserosal based on their location within the uterus or classified as small (< 20 mm), medium (20 mm – 50 mm) or large (>50 mm) based on their size.² Large leiomyomas are usually symptomatic and are associated with dysmenorrhea, menorrhagia, urinary incontinence or constipation.¹

Uterine myomectomy is the treatment of choice for women diagnosed with uterine leiomyomas, who wish to preserve their fertility. According to an analysis by Darai *et al*, laparoscopic myomectomy is indicated for small-to-medium-sized uterine leiomyomas with a diameter of 7 cm or less.³ Laparoscopy provides a safe minimally invasive approach to myomectomy and is associated with less morbidity when compared to open abdominal surgery. However, in the case of large leiomyomas (greater than 8 cm), concerns regarding the laparoscopic approach include longer operating times, difficulty manipulating the bulky uterus, difficulty achieving adequate cleavage planes, and specimen removal. Although larger leiomyomas present a unique surgical challenge, several measures exist to combat the technical drawbacks of the procedure. We outline the surgical steps to achieve a successful laparoscopic myomectomy for large leiomyomas (Table 1).

A. Preoperative Approach

In addition to a routine gynaecological examination and pelvic ultrasonography, pelvic MRI can be an invaluable resource in the preoperative planning of laparoscopic myomectomy for leiomyomas exceeding 8 cm.^{4, 5} Pelvic MRI is the most effective imaging modality that can delineate uterine anatomy, exclude sarcomatous degeneration, and accurately map the size, shape, number, and location of the uterine leiomyomas.⁵ Furthermore, pelvic MRI can estimate the distance between the leiomyoma and

Table 1: Equipment list for modified approach to laparoscopic myomectomy for the removal of large uterine leiomyoma

1	Equipment List	Uterine manipulator 12 mm Optical trocar (×1) 5 mm Accessory trocars (× 3) 0° laparoscope Duckbill graspers (× 2) Tenaculum (toothed) Laparoscopic myoma screw Ligasure™ (Medtronic, USA) 35-mm Maryland Monopolar hook Suction-irrigation system Adrenaline (1 ampoule 1 mg/mL (1:1000) diluted in 100 mL isotonic saline solution) Laparoscopic retrieval bag
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endometrium which enables the surgeon to anticipate or avoid entry into the endometrial cavity.

In addition, preoperative treatment with gonadotrophin-releasing hormone (GnRH) agonists can reduce the size and vascularity of large uterine leiomyomas.⁶ According to Istre, GnRH agonists should not be routinely used prior to leiomyoma surgery and their use should be limited to cases where the size of the uterus is > 600 mL.⁷ GnRH agonists such as leuprolide or goserelin are administered once every month for up to six months and can reduce leiomyoma size to 67.1% of baseline during standard treatment.^{7, 8} Notwithstanding the favourable effects of GnRH agonists, leiomyoma enucleation may be cumbersome as these agents induce hyaline degeneration, producing an ill-defined pseudocapsule that obscures surgical cleavage planes.^{8, 9}

B. Intraoperative Approach

(i) Laparoscopic port placement

Intraoperatively, the laparoscopic ports are strategically placed. Palmer’s point (located 2-3 cm below the left costal margin along the midclavicular line) may be utilised to achieve a global view of the uterus given its size and avoid uterine injury upon abdominal entry.⁴ Accessory ports (5 mm) may be placed lateral to the inferior epigas-

tric arteries on either side of the midline to allow effective uterine manipulation and prevent instrument crowding at the umbilicus.¹⁰ Additionally, an extra 12mm supraumbilical port may be utilized to facilitate specimen extraction.

(ii) Strategies to limit intraoperative blood loss

Limiting intraoperative blood loss is imperative. Intra-myometrial adrenaline (1 ampoule diluted in 100 mL isotonic saline solution), injected along the planned serosal incision, limits blood loss by inducing vasospasm of the vessels feeding the leiomyoma.¹¹ This is an effective method of minimizing intraoperative blood loss however, there is a risk of incidental intravascular infiltration which may lead to altered haemodynamics, particularly in patients with a history of cardiovascular disease.⁵ In addition, a laparoscopic tourniquet that incorporates the uterine and ovarian vessels, fastened at the cervix, may be utilized to reduce intraoperative blood loss, particularly if multiple leiomyomas are present.¹² Intermittent release of the tourniquet is acceptable if operative times become prolonged. In our case with a solitary leiomyoma, intra-myometrial infiltration of adrenaline effectively limited blood loss without the need for a laparoscopic tourniquet.

(iii) Strategies to reduce leiomyoma size for extraction

Laparoscopic power morcellators can effectively reduce leiomyoma volumes for specimen extraction. However, there is a significant risk of disseminating occult malignancy, injuring surrounding organs, and generating parasitic leiomyomas secondary to intraabdominal scattering of fibrous debris.¹³ As a result, the US Food and Drug Administration (FDA) issued a warning in 2014 against the use of power morcellators in women undergoing laparoscopic myomectomy or hysterectomy for uterine leiomyomas.¹⁴ One alternative method of reducing the size of large leiomyoma specimens for extraction is contained dissection within an endoscopic bag, utilising sharp instruments.⁵ Contained sharp manual dissection is a safe, practical, and cost-effective approach to facilitate specimen extraction and reduce the morbid risks associated with the use of power morcellation.^{5, 10} In our facility, we have adopted the contained sharp manual dissection technique for leiomyoma extraction.

In conclusion, laparoscopy is a feasible, practical, and safe minimally invasive approach for the removal of large uterine leiomyomas. Although this procedure may be technically challenging, modifications to a standard myomectomy for large uterine leiomyomas make the laparo-

scopic approach a suitable option for fertility-sparing surgery, even in a low-resource setting. With appropriate perioperative planning, women experience a shorter hospitalization duration, lower morbidity rates, faster recovery rates, and overall better cosmetic outcomes compared to open abdominal surgery.

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REFERENCES

1. Zimmermann A, Bernuit D, Gerlinger C, Schaefer M, Geppert K. Prevalence, symptoms and management of uterine fibroids: an international internet-based survey of 21,746 women. *BMC women's health*. 2012;12:6-.
2. Holdsworth-Carson SJ, Zhao D, Cann L, Bittering S, Nowell CJ, Rogers PAW. Differences in the cellular composition of small versus large uterine fibroids. *Reproduction*. 2016;152(5):467-80.
3. Darai E, Deval B Fau - Darles C, Darles C Fau - Benifla JL, Benifla JL Fau - Guglielmina JN, Guglielmina Jn Fau - Madelenat P, Madelenat P. [Myomectomy: laparoscopy or laparotomy]. (1165-1083 (Print)).
4. Granata M, Tsimpanakos I, Moeity F, Magos A. Are we underutilizing Palmer's point entry in gynecologic laparoscopy? *Fertility and Sterility*. 2010;94(7):2716-9.
5. Sano R, Suzuki S, Shiota M. Laparoscopic Myomectomy for the Removal of Large Uterine Myomas. *Surgery journal (New York, NY)*. 2019;6(Suppl 1):S44-S9.
6. Chen I, Motan T Fau - Kiddoo D, Kiddoo D. Gonadotropin-releasing hormone agonist in laparoscopic myomectomy: systematic review and meta-analysis of randomized controlled trials. (1553-4669 (Electronic)).
7. Istre O. Conservative treatment of fibroids. *Gynecological Surgery*. 2007;4(2):73-8.

8. Bahall V, De Barry L, Harry SS, Bobb M. Gross Ascites Secondary to Endometriosis: A Rare Presentation in Pre-Menopausal Women. (2168-8184 (Print)).
9. Tinelli A, Malvasi A, Hurst BS, Tsin DA, Davila F, Dominguez G, et al. Surgical management of neurovascular bundle in uterine fibroid pseudocapsule. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2012;16(1):119-29.
10. Sinha R, Sundaram M. Laparoscopic management of large myomas. Journal of gynecological endoscopy and surgery. 2009;1(2):73-82.
11. Muthukumar M, Mathews L, Vasanth N, Anoop S. Intra-myometrial vasopressin as a haemostatic agent: Is it really safe? Indian journal of anaesthesia. 2015;59(1):51-3.
12. Li W, Wang G, Lin T. Application of laparoscopic tourniquet in myomectomy. International Journal of Gynecology & Obstetrics. 2020;148(1):124-5.
13. Milad MP, Milad EA. Laparoscopic morcellator-related complications. (1553-4669 (Electronic)).
14. FDA U. Updated laparoscopic uterine power morcellation in hysterectomy and myomectomy: FDA safety communication [www.fda.govNovember](http://www.fda.gov/November) 2014