

## A Minimally Invasive Laparoscopic Myomectomy for Fertility preservation: Addressing Cultural Needs in a Patient with Large Myomas

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## 1. Abstract

### 1.1. Background

Laparoscopic myomectomy is a minimally invasive option for managing uterine leiomyomas, favored for its benefits of faster recovery, less pain, shorter hospital stays, and more favorable cosmetic appearance of the scar compared to open surgery. It also leads to less risk of adhesions, thus preserving future fertility. This particularly has a social and cultural significance for unmarried virgin females in the Middle East. However, this procedure can be challenging in the presence of large myomas.

### 1.2. Case Presentation

A 30-year-old virgin case presented with severe menorrhagia, resulting in multiple previous hospital admissions for blood transfusions. Abdominal sonography revealed two large, adjacent, and adherent intramural leiomyomas, forming a mass of 23 cm (one 17 cm and one 6 cm). Given the patient's desire for future fertility and fear of social stigmatization associated with open surgery scarring, a minimally invasive approach was chosen to remove the large fibroids, minimize postoperative adhesions, optimize cosmetic outcomes, and preserve fertility. The procedure successfully removed a total of 2612 grams of fibroids in 1 hour and 50 minutes, with careful uterine repair and no intra- or postoperative complications.

### 1.3. Conclusions

This case highlights the effectiveness of minimally invasive sur-

gery as a viable treatment option for managing large myomas. Its better cosmetic appearance, favorable surgical outcomes, and fertility preservation make it an effective and reliable choice, even for large myomas.

## 2. Introduction

Uterine leiomyomas, or fibroids, are the most common benign tumors of the female genital tract, arising from the smooth muscle and connective tissue of the myometrium. Uterine fibroids can vary significantly from a few millimeters to massive growth exceeding 20 cm in diameter [1,2]. They often cause significant symptoms such as heavy menstrual bleeding (menorrhagia), pelvic pain, and pressure-related discomfort due to their size and location. Managing large myomas in young patients, especially those who have not yet conceived, poses unique challenges due to the need to balance effective treatment with the preservation of future fertility [3,4]. In certain conservative societies, such as the Arab populations, there are a lot of concerns regarding genital surgeries. For example, they consider the woman's ability to conceive as an indication of her dignity and social status [5,6]. Furthermore, the social stigmatization of open-surgery scarring creates a psychological burden [7]. Identifying surgical options that provide optimum surgical outcomes and addressing the patient's concerns is crucial. Minimally invasive techniques such as laparoscopic myomectomy offer distinct advantages over open surgery, including reduced postoperative pain, shorter hospital stays, and faster recovery times [4,8,9].

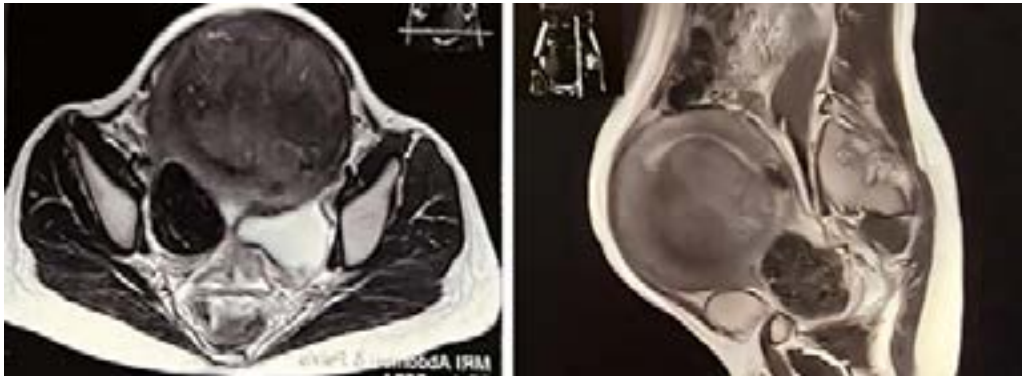
In this paper, we present a case of laparoscopic myomectomy of multiple large fibroids in a young virgin case. This technique was chosen to align with the patient's cultural beliefs regarding fertility preservation and preference for the cosmetic benefits of laparoscopic surgery.

### 3. Case Presentation

A 30-year-old virgin female presented with a history of severe, painful menstrual bleeding and increased abdominal size for over one year that interfered with her daily life, leading to discomfort with her wardrobe choice. Her low BMI of 19.5 Kg/m<sup>2</sup> contributed to the heightened visibility of her abdominal enlargement, significantly impacting her self-confidence and perception of body image. Moreover, the visible large mass caused psychological distress for the patient due to cultural conceptions that such a large mass may interfere with her fertility. Her past medical history was significant for severe anemia that required multiple blood transfusions. Her medical, gynecological, and family histories were otherwise unremarkable. On examination, a large, solid, and palpable abdominal mass extending above the umbilicus was noted. Abdominal sonography revealed two adjacent, adherent fibroids with a combined size of 23 cm. The first one was an intramural fibroid measuring 17 cm and located anteriorly and to the right, indenting the endometrium and causing a uterine bulge to the right. The second was subserosal, measuring 6 cm, anteriorly located at the left lower uterine region and extending to less than 50% of the myometrium. There was no evidence of ascites or other pathological changes in the pelvis or abdomen. The diagnosis was confirmed by MRI with contrast, as shown in (Figure 1). The patient had sought multiple medical consultations prior to her visit to our institution. She was offered a variety of treatment options, including open surgery through a transverse or longitudinal incision, as well as hysterectomy. None of these options aligned with the patient's cultural and social values. As a virgin, unmarried woman who strongly prioritized fertility, she was unwilling to consider any treatment option that would compromise her ability to conceive. Moreover, she was distressed about potential societal judgment and stigmatization concerning open-surgery scar, the possibility of infertility, or hymenal disruption. Thus, she neglected her treatment until the myoma kept growing larger. The patient also reported that she was refusing marriage or future relationships during this period because of her fear of infertility associated with this large myoma. When she presented to our institution, we had a thorough discussion with her about all treatment options, including both open and laparoscopic approaches. This was the first time the patient was offered a laparoscopic approach. After understanding the benefits and risks of all procedures, the patient consented to a minimally invasive approach. Accordingly, our team proceeded with laparoscopic surgery. Routine preoperative laboratory tests such as complete blood count (CBC), liver function tests (LFT), kidney function tests (KFT), coagulation profile, and random blood sugar

(RBS) were done and were within the normal range. The laparoscopic procedure (Figure 2 and Supplementary Video S1) began with establishing pneumoperitoneum using a Veress needle placed above the umbilicus to achieve an intra-abdominal pressure of 15 mmHg. A central supraumbilical 10 mm port was first introduced for the laparoscope, followed by three lateral accessory trocars placed under direct visualization. These trocars created access points through which corresponding ports were inserted to allow the passage of laparoscopic instruments.

Two suprapubic ports (5 mm and 10 mm) were strategically positioned lateral to the deep inferior epigastric arteries and were used to facilitate optimal access to the fibroids. A third 5 mm trocar was placed in the midline, at or above the level of the other two ports. Laparoscopy revealed that the fibroids were located anteriorly. After identification of the hysterotomy site and to minimize bleeding, laparoscopic injection of vasopressin between the myometrium and the fibroid capsule was done until blanching occurred. Dissection began from the left pelvic side wall, targeting the serosal layer within the myometrium using a harmonic scalpel (Ethicon Endo-Surgery, Cincinnati, Ohio, USA). The procedure continued until the myoma pseudo capsule was exposed. Once the fibroid was visualized, traction using a tenaculum was applied to the myoma along with a countertraction on the uterus, which facilitated further dissection. The fibroids were carefully separated from the myometrium using a push-and-spread technique, with adequate traction and counter-traction supporting the procedure. The fibroids were enucleated using a rolling technique facilitated by a 0-degree camera for optimal visualization. In order to achieve hemostasis, bipolar coagulation was used to seal the blood vessels supplying the myoma. This technique involves applying electrical current using bipolar forceps to provide precise control, ensuring minimal surrounding tissue damage, and paying attention not to damage nearby critical structures, such as the ureter or uterine vessels. After enucleation, the uterus was repaired in multiple layers, with careful attention to preserving the myometrium for maintaining uterine function for future pregnancies and avoiding breaching the serosa or hematoma formation. Continuous barbed sutures were used in four layers to restore normal uterine anatomy. The fibroids were then removed from the pelvis via morcellation. No intraoperative complications were observed. The procedure lasted 1 hour and 50 minutes with an operative blood loss of 400 ml. No blood transfusions were required intraoperatively or postoperatively. On the first postoperative day, the hemoglobin (Hb) level was 11 g/dL, and the pain was managed with a visual analog scale (VAS) score of 4. The visual appearance of the abdomen significantly improved (Figure 3). Minimal vaginal bleeding was observed, and the patient was discharged 24 hours after surgery. Follow-up assessments were scheduled to monitor recovery, uterine repair integrity, and potential complications. The patient reported significant symptom relief and was satisfied with the surgical outcomes.



**Figure 1.** Magnetic Resonance Imaging (MRI) scan with contrast, depicting two large, adjacent, and adherent intramural leiomyomas of 23 cm within the uterus (one 17 cm and one 6 cm).



**Figure 2:** Key surgical techniques employed during the laparoscopic myomectomy: (A) Counter-Traction: Demonstrates the application of opposing forces to facilitate dissection and mobilization of the fibroid; (B) Push & Spread Technique: Shows the method used to separate the fibroid from the surrounding myometrium by pushing and spreading the tissue layers; (C) Rolling Technique: Depicts the rolling maneuver to entirely displace and enucleate the fibroid from its bed; and (D) Suturing the Serosa: Highlights the final step of suturing the serosa separately after the myometrium has been sutured, ensuring proper anatomical restoration and future uterine function.



**Figure 3:** Comparison between the abdominal contour, size, and shape of the abdomen before and after laparoscopic removal of huge uterine myoma.

## 4. Discussion

There are various treatment options for uterine myomas, including medical, non-surgical, and surgical management. Symptomatic myomas can be treated by hysterectomy unless the patient needs to preserve fertility. In such cases, myomectomy can be a better alternative. Abdominal myomectomy used to be the traditional option for treating symptomatic myomas. However, it is associated with unfavorable cosmetic appearance and postoperative pain that limited its use. Moreover, it carries a significant risk of adhesions, which, in turn, impairs the fallopian tube functions, accounting for 20-40% of female infertility. Laparoscopic myomectomy has gained more popularity in recent decades due to its suggested favorable surgical outcomes [10]. Laparoscopic myomectomy is a minimally invasive approach for removing uterine leiomyomas, offering benefits compared to traditional open surgery [11]. This technique shows an advantage over laparotomy in terms of minimizing adhesions and preserving fertility [10]. There is a global underutilization of laparoscopic myomectomy making it not always available for patients. This could be due to the expertise and advanced technique required for this surgery. Moreover, the increased cost of laparoscopic myomectomy over abdominal surgery may constitute a significant limiting factor. In the United States, the utilization of minimally invasive myomectomy accounts for only 10% of patients [12]. Our case demonstrates the successful use of laparoscopic myomectomy to remove two large, adjacent intramural leiomyomas with a combined size of 23 cm. This highlights the effectiveness of laparoscopic techniques in overcoming significant challenges, such as limited visualization, restricted manipulation space, difficulties in cleavage and removal, and increased operative time, while minimizing the risk of conversion to laparotomy or hysterectomy. Previously, Aksoy et al. described the successful laparoscopic removal of a 17 cm, 2005 g intramural myoma in a 33-year-old woman. The 140-minute procedure involved enucleation and morcellation, with an unremarkable postoperative course [13]. Similarly, Yadav et al. reported a laparoscopic myomectomy for a 29-year-old woman with a large myoma equivalent to 34 weeks of pregnancy, which was performed without complications [14]. Further supporting these findings, a study of 178 women showed that laparoscopic myomectomy was successfully performed for large myomas ranging from 7 to 16 cm. The study highlighted laparoscopic myomectomy as an effective technique, with a high success rate, an average operating time of 105 minutes, and minimal blood loss. However, long-term outcomes, particularly concerning adhesion formation and fertility restoration, remain to be thoroughly evaluated [15]. Additionally, a larger-scale study involving 417 patients at a tertiary care hospital confirmed the success of laparoscopic myomectomy with multilayer closure for both large and medium-sized myomas, reporting excellent results and no intraoperative complications [16]. Moreover, Hawa et al. demonstrated the use of preoperative angiography with transient

uterine artery embolization to aid laparoscopic myomectomy for massive myomatous uteri, significantly reducing intraoperative bleeding and avoiding the need for conversion to laparotomy. This emphasizes the value of meticulous preoperative planning and innovative techniques in managing large myomas [17]. Our case was particularly challenging in various aspects. First, there were two large adherent fibroids. Second, the cultural conception and stigmatization regarding infertility and surgical scars create a psychological and social burden [5,7]. This case contributes to the evidence showing that fertility can be preserved even during large fibroid removal, addressing key psychological concerns and taking specific cultural considerations into account. In this case, patient outcomes were favorable, with the patient reporting significant symptom relief and excellent recovery. The patient was discharged home 24 hours following the procedure, and follow-up assessments demonstrated successful uterine repair with no signs of complications. These findings are consistent with prior evidence that laparoscopic myomectomy procedures are associated with shorter hospital stays and overall recovery than open surgery [18,19]. An additional benefit of uterine preservation, in this case, also maintains the patient's ability to conceive, which is a critical outcome for women of childbearing age undergoing myomectomy.

## 5. Conclusions

This case highlights the use of laparoscopic myomectomy as a convenient surgical management option for large fibroids in virgin females. It demonstrated positive surgical outcomes and patient satisfaction regarding cosmetic appearance and postoperative symptom relief. This technique can be a suitable option for patients who desire future fertility and preservation of the hymen. The successful outcome underscores the benefits of personalized planning and minimally invasive approaches in modern gynecologic practice, supporting culturally sensitive patient care. More attention should be warranted to increase accessibility and equity in laparoscopic myomectomy for different patient populations.

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