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Laparoscopic Myomectomy as a Treatment for Uterine Fibroids



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ABSTRACT

In reproductive-aged women, fibroids make up anywhere from 5.4% to 77% of benign uterine tumors. Black individuals have a prevalence of fibroids nine times higher than Caucasian individuals. progesterone appears to be an essential factor in fibroid development. laparoscopic myomectomy is a relatively recent procedure. Surgical removal is reserved for myomas that are particularly difficult to treat medically or that do not respond to standard medical protocols. Due to its numerous benefits over laparotomy, the indications for surgical laparoscopy have grown substantially in the last several decades on pages 13 and 14, Thanks to recent advancements in technology, myomectomies can now be performed using laparoscopy. A relatively recent procedure, laparoscopic myomectomy [15-18]. This paper aims to showcase our surgical method, outcomes, and the reasons why laparoscopic myomectomy is necessary.



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INTRODUCTION

Effects and Causes in Biology Depending on the method of diagnosis, fibroids make up anywhere from 5.4% to 77% of benign uterine tumors in reproductive-age women. ^[1] As a woman's reproductive years come to a close, the likelihood of these conditions increases. Compared to Caucasian populations, Black individuals have a prevalence of fibroids that is nine times higher.^[2,3] These tumors appear macroscopically as hard, round, or oval masses made up of whorled smooth muscle bundles. Despite their seemingly unitary appearance, they are many, spatially and dimensionally variable entities. Intramural fibroids develop within the uterine myometrial layer; submucosal fibroids occur within the myometrium; and subserosal fibroids occur outside the myometrium. Parasitic fibroids occur when fibroids receive blood flow from sources other than the myometrium. Two surprisingly common locations for them to occur are the cervix of the uterus and the broad ligament layers. ^[4] Connective tissue and smooth muscle fibers make them up histologically. There is no known reason for fibroids. Theoretically, they develop from a single cell that has had a mutation that regulates proliferation. The numerous chromosomal rearrangements seen in fibroid cells are believed to contribute to the abnormal slowing of cell proliferation. ^[5,6] In menopause and as a result of downregulation therapy with receptors that bind to gonadotropin-releasing hormone (GnRH), estrogen-dependent tumors known as fibroids diminish. Additionally, progesterone appears to be an essential factor in fibroids' development. ^[7] Some researchers think that vascular endothelial growth factor and other region-specific growth factors and epithelial growth factor mediate the effects of estrogen and progesterone, even though fibroids have receptors for these hormones. ^[8] Hormonal signals known as growth factors interact with fibroid tissues, leading to the enlargement of fibroids. Fibroids proliferate when estrogen and progesterone levels are high. Fibroids contain the growth factors in greater quantities than the surrounding myometrium. Through molecular biology studies, Possible tumor-initiating factors include transforming growth factor, vascular endothelial growth factor-A, collagen type I and type III induction, and others; however, the exact mechanisms by which these triggers work remain unclear. ^[9], and the interleukin 810 as critical components. Furthermore, it seems that there is a hereditary tendency. ^[10] In a subset of fibroids where 12:15 translocations have been discovered, at least one gene, HMGIC, seems to be involved.^[11]

Myomas of the uterus occur often. The prevalence of myomas in genitally active women ranges from 20% to 25%. ^[12] Surgical removal is reserved for myomas that are particularly

difficult to treat medically or that do not respond to standard medical protocols. Due to its numerous benefits over laparotomy, the indications for surgical laparoscopy have grown substantially in the last several decades. on pages 13 and 14, Thanks to recent advancements in technology, myomectomies can now be performed using laparoscopy. A relatively recent procedure, laparoscopic myomectomy [15-18]. This paper aims to showcase our surgical method, outcomes, and the reasons why laparoscopic myomectomy is necessary.

Clinical presentation of fibroids

Roughly half of fibroids do not cause any noticeable symptoms and are discovered by chance during a clinical or ultrasound evaluation. Menorrhagia, dysmenorrhoea, pressure feelings, and subfertility are some of the symptoms that fibroids can cause when they are active. Researchers [Wegienka et al]. looked at how uterine leiomyomas were correlated with subjective reports of bleeding, together with the extent and site of the bleeding. [19] With a random sample of females between the ages of 35 and 49. The size and location of the leiomyomata were measured using abdominal and transvaginal ultrasounds. The ladies were then interviewed over the phone about any symptoms they had after heavy bleeding. The likelihood of women with big leiomyomas using more than eight tampons or pads on the days with the heaviest period of d bleeding was about 2.5 times higher than the risk for women without leiomyomas, and this risk rose as the leiomyomas got larger. An increase in severe bleeding was nearly identical for non-submucosal fibroids as it was for submucosal fibroids of the same size. Heavy bleeding was shown to be more likely with smaller leiomyomata, and the risk rose with size, according to the scientists. Heavy bleeding was connected with both submucosal and non-submucosal fibroids to the same degree, contradicting previous research.

Saromatous fibroid is a sporadic and dangerous malignant tumor of the smooth muscle that affects about 0.1 percent of fibroids. [20] For forty percent of women who experience heavy or delayed menstruation, the cause is a fibrous mass either inside the uterine wall or just below it. [21-24] When designing a treatment plan for fibroids or severe menorrhagia, the patient's lifestyle preferences and needs must be carefully considered. (such as the number of workdays missed due to symptoms) and her intentions toward having children.

Our surgical technique

The ability to tie knots within the body, the necessity for sophisticated laparoscopic suturing, and the increased likelihood of bleeding during surgery make laparoscopic myomectomy a more complex treatment than laparoscopic hysterectomy, which seems contradictory. Less

blood loss occurs after laparoscopic hysterectomy because the uterine arteries can be managed before ovulating the uterus. Also, instead of spending time and money on a laparoscopic morcellator, fibroid uterus removal can be accomplished by bivalving the uterus with proceed through the vaginal opening using laparoscopic scissors. Due to the lack of uterine blood flow control during laparoscopic myomectomy, there is a higher risk of bleeding and difficulties with visualization these complications might heighten the likelihood of surgical damage or necessitate a switch to the open procedure, also known as abdominal myomectomy. A laparoscopic morcellator is typically needed because the vagina is not opened, which adds time and money to the operation. Even for an experienced advanced laparoscopic surgeon, the lengthy laparoscopic suturing that may be necessary due to several uterine incisions is a significant time sink.

When dealing with corneal myomas, it is important to be cautious so as not to harm the Fallopian tube as it travels through the myometrium to the endometrial cavity. When making incisions, take care not to damage the tube track. Stay away from the area you suspect has the tube track while suturing. Occluding the lumen and "iatrogenic" infertility can be avoided with this.^[25]

When dealing with a uterus that has many fibroids, it is best to minimize the number of incisions made to remove as many of the fibroids as feasible. Removing nine or more fibroids at once may be necessary. For novice minimally invasive surgeons, this is a difficult laparoscopic procedure. Usually, fibroids are approached and removed by two incisions one on the front and one on the back that are specifically designed for this purpose. Fibroids vary in size, shape, and position, thus it may be required to make multiple incisions to remove them all. ^[26]Over large fibroids, the intramural segments of the tubes were hung.

Over large fibroids, the intramural segments of the tubes were hung in a recent case involving a woman with two tumors that were placed in such a method. The idea of laparoscopically eliminating these tumors while simultaneously protecting the right and left tubal tracks was unsettling to us. Although we were initially planning to perform a myomectomy rather than a hysterectomy, we decided to open the case because we were worried about the patient's unique anatomy and the potential impact on her fertility. Our primary concern was not the inability to remove the fibroids laparoscopically. ^[27]

General Considerations.

Intraoperative problems arising from improper hysterectomy, enucleation, hemostasis, or morcellation injuries are possible with laparoscopic myomectomy. Another possibility is that problems will arise after the operation has taken place, such as adhesions in the pelvis, a hematoma at the hysterotomy site, or even a recurrence. Laparoscopic myomectomy carries the risk of obstetric problems as well. Intraoperative complications occurred in 2.6% of patients and problems that occurred after the procedure in 5.7% of patients following the laparoscopic removal of 654 fibroids, myomas averaging 5.3 cm in size ^[28]. Another study looked at 2,050 laparoscopic myomectomies and found an overall complication rate of 11.1% (225/2050 patients). ^[29]

Intraoperative Complications.

Laparoscopic myomectomy problems most commonly include severe hemorrhage, hematoma in the uterus, and morcellation errors. Factors that increase the likelihood of bleeding during surgery include inadequate administration of agents that restrict blood vessels; the number of fibroids, their size and placement, and the wrong feeding vessel or cleavage plane identification; inadequate hemostasis; surgical incompetence, sloppy knotting, and inaccurate suturing (Table 1.0) ^[30]. After surgery, whether there is adenomyosis or an adenomyoma, the most common intraoperative complication is difficulty with uterine wound approximation.

(Table 1.0) No vasoconstrictive procedures are used to stop intraoperative bleeding during laparoscopic myomectomy.

Study	Myoma multiple	Hospitalization	Patients number	Bleeding ml	Myoma size cm	Conversion to LMY	Myoma type
Sankaran and Odejinmi, 2013 [38]	3.7	ND	125	ND	7.6	1.6	ND
Walid and Heaton, 2011 [34]	ND	ND	41	2–1200 ml	2–15.6	ND	ND
Dubuisson et al., 1995 [38]	ND	ND	71	ND	>5	2.7	IM
Sizzi et al., 2007 [29]	48	ND	2050	ND	>4	0.34	ND
Mallick and Odejinmi, 2017 [36]	4 +/- 3.6	1.9 +/- 0.95 days	323	279 +/- 221	7.7 +/- 2.8	0.6	IM 49% SS 33%
Mathew et al., 2013 [40]	44	1–5	1,001	248 mL avg, 1 transfer	ND	1 death pop un expect	ND
diZerega, 1997 [35]	ND	2.09 days	54	84	>3	1.8	IM 34% SS 19%
Tinelli et al., 2012 [31]	48	86% 48 hs	235	118 +/- 28	4–10	0	SS + IM
Saccardi et al., 2014 [40]	ND	ND	444	2/444	8–12	1.35	ND
Malzoni et al., 2006 [37]	47	ND	982	3/98	6.7 +/- 2.7	1.29	IM -75%

Management of Anemic Patients.

Iron supplements and folic acid, given intravenously or orally, oral contraceptives, or one more hormonal medication that is intended to lessen or eliminate heavy periods are some of the options for treating preoperative anemia. Preoperative GnRHa anemia can decrease myoma size and vascularization, which in turn prevents bleeding, as previously stated. Another drug that may alleviate symptoms and reduce the size of fibroids is ulipristal acetate, which modulates the effect of progesterone. Myomectomy can be performed after three months of treatment with ulipristal acetate. Significant volume decrease and cessation of metrorrhagia can also be achieved with ulipristal acetate treatment. [42, 43].

Laparoscopic myomectomy: surgical procedure

There has already been a description of the method we employed [42]. What follows are the many stages of the operation and their respective critical points.

1. Anaesthesia and positioning of the patient.

General anesthesia is used for previous anesthesiopic myomectomies. A catheter known as a Foley was inserted. Before a lithotomy can commence, the patient must be positioned in the stirrups. This makes it possible to inject a diluted dye solution and narrow a uterine cannula. Methylene blue injection colors the endo myotis, making it easier to cleave myomas close to the uterine cavity and seal the myometrium following an unintentional or intentional breach of the vaginal opening. We use colors to mobilize the uterus after injecting mobilize lacing the cannula.

2. Surgical equipment

When performing my mastectomy, we discovered that additional instruments were needed Axial panoramic optinsulatorems, autonomously controlled insulators, other standard tools for laparoscopic surgery, a video system, a device for aspiration, and irrigation. The uterine vascularization determines the optimal 5 mm monopolar hook can perform coagulation in addition to cutting, or it can do coagulation alone. To achieve excellent hemostasis, you must use bipolar coagulating wide-jawed forceps. The myoma is typically dissected with the use of two grasping forceps. During enucleation, traction is applied to the myoma using laparoscopic forceps that have jaws that are 10 mm in diameter. The tools needed for uterine closure using laparoscopic suture technology include a 5 mm laparoscopic needle holder, non-claw atraumatic grasping forceps, and suture material. A 10 mm trocar can be used to insert a 10 cm 3/O vicryl or 410 PDS with a 318 circular needle, or a 20 mm straight needle (Ethicon, Ethnor, France). Vaginal surges and mini-laparotomy instruments are required to remove the myoma. Uterine fibroids can also be surgically removed using an electrical cutting instrument. ^[43]

3. Suprapubic trocar placement.

The proper placement of the three suprapubic trocars depends on the patient's uterine size. for this surgical approach to be safe. Trocars need to be positioned higher about the uterus's size. Place the trocars two or three centimeters uterine fundus. when dealing with lateral or posterior myomas. To treat anterior myomas, Trocars can be put closer to the pubis with the help of the uterine manipulator, which retroverts the uterus.

4. Principles of the technique

The myomas must be exposed properly, and uterine cannulation makes that possible. It is crucial to detect even the tiniest bump and examine any asymmetry about the ligaments of the round while searching for intra-mural myomas. Finding the ureter is crucial when dealing with myomas on the wide ligament or behind the isthmus. It is crucial to follow the basics of minimally invasive surgery for infertility at all times throughout the myomectomy procedure, which is conducted on young women and is considered a conservative and minimally invasive operation. The approach varies based on where the myomas are located:

- ✓ When dealing with myomas in the wide ligament, it is best to begin the dissection from the front by slicing the circular ligament.
- ✓ The procedure is not too complicated when dealing with pedunculated myomas. A piece of the pedicle and bipolar coagulation make it up. No sutures are necessary if the implant's surface area is less than 1 cm².
- ✓ A hysterotomy is done at the location of the myoma when it is sessile subserous or interstitial. Although horizontal incisions are occasionally performed, vertical incisions are more commonly employed [44]. To cut, we employ the monocular is common practice to use bipolar forceps to coagulate the myometrial arteries further. There are no vasoconstrictive drugs used in our practice. By tractioning on the myoma, the cleavage plane is revealed when the gripping forceps secure it. The tools needed to accomplish atraumatic enucleation include a pelvic leaner, big forceps, and a monopolar hook. Perfect hemostasis is ensured before suturing the hysterotomy. To increase the likelihood of adhesion on such a big exposed area and to stop the myometrium from rupturing in a future pregnancy, sutures are used. It is common practice to use interrupted intraperitoneal knots to shut the uterus in a single layer. It may be beneficial to stitch the uterus in two planes as the myoma becomes firmly embedded in the myometrium [44]. Extraperitoneal sutures are another [option]. Using a knot pusher, knots in extraperitoneal sutures can be removed.[45- 47].

To perform and prevent peritonantation, which causes pain, myomas must always be removed. The myomas can be extracted using a variety of methods. After enlarging Uterine fibroids can be removed with a suprapubic puncture after a 20 mm incision with one or two single-totenacululum. To stop CO loss, you have to push the myoma against the peritoneum at the suprapubic incision.

A tiny blade is inserted via the incision and the myoma is then shattered under laparoscopic control. After removing every piece of myoma, the incision is stitched shut in two directions. Only myomas of a small to medium size can be safely removed via this suprapubic approach. A posterior colpotomy is the method of choice for bigger myomas when it comes to extraction. It is in the inh of Douglas that the myoma is lowered. Tentinum forceps are used to grab the myoma after the vaginal type of colpotomy has been performed. Myoma fragmentation is the standard method for reducing tumor size. The next step is to use a common procedure to tutumorhe vagina. Alternatively, Using a monopolar hook, the colpotomy can be done laparoscopically. The incision is made easier by applying a vaginal compress to the rear of the cul de sac. A newer option for severing the myoma is an electrical cutting instrument. [43]. A 12 mm trocar is used for its introduction. Following the myoma excision, a thorough peritoneal cleansing can be performed using laparoscopy. It is also possible to monitor for bleeding during this procedure. It does not use drainage



Conclusion

The majority of benign tumors identified in reproductive-aged women are uterine fibroids. While some fibroids may not cause any symptoms at all, depending on their location and size, those that do often include bleeding disorders, pain, lower abdominal complaints, and issues caused by the displacement of nearby organs. Bimanual examination and serous imaging techniques such as ultrasonography, hysterosalpingography, hysteroscopy, or magnetic resonance imaging (MRI) can be used to diagnose uterine fibroids, depending on their location. Fibroids that cause symptoms should not be treated. Fibroid treatment is enhanced by laparoscopic procedures and preoperative GnRHa administration. The patient experiences less pain and a shorter hospital stay with a laparoscopic method. Following

GnRHa treatment, hysteroscopic surgery will be less invasive. Myometrial and fibroids decrease, allowing for full excision. Reducing the likelihood of fluid absorption, distension medium consumption, and hemorrhagic propensity, endometrial atrophy improves visibility at the surgical site. Three months of concurrent GnRHa and iron treatment before scheduled surgery can alleviate anemia associated with menorrhagia, regardless of the procedure. It is necessary to consider and rule out cancer in situations when there is no substantial reduction after 2 months of medication. One last option for patients who cannot undergo surgery is long-term GnRHa treatment in conjunction with add-back therapy. Possible future improvements to fibroid therapy could be achieved with the use of RU 486 in conjunction with a GnRH antagonist, Danazol.

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