Laparoscopic Myomectomy

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Leiomyomas are the most common benign pelvic tumors. They can be asymptomatic but frequently cause symptoms of abnormal uterine bleeding, anemia, pelvic pressure, urinary frequency, and impaired fertility. Based on improved perioperative outcomes, myomectomy, using a minimally invasive approach, is the preferred treatment modality for symptomatic women desiring future fertility. Detailed imaging can be done preoperatively and even intraoperatively to maximize removal of all accessible myomas. A laparoscopic approach is preferred for myomas not accessible through the hysteroscope. Myomectomy can significantly improve the quality of life for symptomatic women, and in many cases it can improve reproductive outcomes.

Uterine leiomyomas are the most common benign pelvic tumors, occurring in up to 70 % of white women and 80 % of African American women [1]. Depending on the size and location of the tumor, they may cause adverse pregnancy outcomes, bleeding, and pressure. Treatment options are based on the symptoms that they cause and can include continuing observation or medical or surgical options. Surgical options may include hysterectomy, uterine artery embolization, myomectomy, magnetic resonance–guided focused ultrasonography, and the newer US Food and Drug Administration approved procedure Acessa (Halt Medical, Inc.; Brentwood, CA). Myomectomy remains the surgical option of choice for those who wish to retain their fertility. It is also an option for those who have completed child-bearing but wish to retain their uterus.

It is well established that compared to open laparotomy, laparoscopic myomectomy is preferred and produces less blood loss, shorter hospital stays, faster recovery rates, decreased pain, and better cosmesis.

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2.1 Preoperative Evaluation

2.1.1 Imaging

Symptomatic fibroids are usually seen by the gynecologist with abnormal bleeding or pressure-like symptoms. The diagnosis is typically made with pelvic ultrasound. For women ultimately desiring myomectomy, magnetic resonance imaging (MRI) is the recommended imaging modality of choice. MRI has a greater sensitivity and specificity in terms of the number, size, and location of myomas than ultrasound. It can help identify lesions suspicious for sarcoma and provides superior visualization of the endometrial cavity [1, 2]. MRI results for myomectomy can be reviewed before surgery with the intent of retrieving as many fibroids as possible by compensating for the relatively decreased tactile sensation compared with an open laparotomy. If there is still uncertainty about the integrity of the endometrial cavity, ultrasound with saline infusion or office hysteroscopy should be considered preoperatively.

Preliminary studies with intra-abdominal ultrasound, as used in the Acessa procedure (Table 2.1), demonstrated significantly improved detection of submucosal, subserosal, and intramural myomas [3]. Future use of this intra-abdominal ultrasound during myomectomy may show improved identification and evacuation of myomas. This, in turn, may lead to greater symptom reduction and reduced rates of recurrence.

A preoperative pelvic examination is crucial to alert the surgeon to uterine mobility and potential access to each myoma. If limited mobility or extremely large fibroids are present, plans should be made to have a skilled assistant present, or consideration can be given to pretreatment with a gonadotropin-releasing hormone agonist (GnRHa).

Fig. 2.1 Sections of a magnetic resonance image of a patient with a large uterine fibroid desiring myomectomy. Ultrasound study in this patient could not delineate the endometrium

Fig. 2.2 Magnetic resonance imaging shows small intracavitary myoma

Table 2.1 Halt study

Halt study	Intramural	Subserosal	Submucosal	Transmural	Combination
Laparoscopic ultrasound	386	184	110	27	89
Magnetic resonance imaging	292	121	80	16	22
Transvaginal ultrasound	197	92	42	23	33

Modified from Halt Fibroid Study [3]

2.1.2 GnRHa Pretreatment

A subject of some discussion has been whether or not pretreatment with a GnRHa before laparoscopic myomectomy is beneficial. Some advocate the potential benefit of shrinkage in size of the fibroids with GnRHa pretreatment and on hemostasis [4], whereas others have been concerned with a blurring of the cleavage plane between the myoma and the myometrium [5]. A recent systematic review and meta-analysis [6] has clarified the issue that pretreatment with GnRHa does not increase the operative time associated with laparoscopic myomectomy, a finding consistent with the most recent similar Cochrane review [7] related to the topic. Operative time can be thought of as a surrogate for operative ease, which would incorporate several surgical factors including myoma size, hemostasis, and the cleavage plane between the myoma and the myometrium.

Systematic reviews [6, 7] of the three randomized trials on GnRHa pretreatment before laparoscopic myomectomy did demonstrate a statistically significant reduction in intraoperative blood loss (60 mL) and postoperative hemoglobin (1.15 g/dL). It is debatable whether these findings have clinical significance. It is also interesting to note that there is a discrepancy between the very minimal decrease in intraoperative blood loss and the decrease in postoperative hemoglobin. It is possible, too, that a potential benefit of pretreatment (for 3–6 months) with GnRHa of surgical bleeding is outweighed by the adverse effects of cost and the delay in receiving treatment. This discrepancy may be attributable to an inaccurate estimate of intraoperative blood loss but also may be because of continued postoperative bleeding or oozing. If the latter is true, pretreatment with GnRHa may have a benefit on reducing peritoneal inflammation and postoperative adhesion formation given less postoperative blood loss. Further multicenter and long-term trials are needed.

Table 2.2 Pros and Cons of GnRHa pretreatment

PROS:
May lead to shrinkage in the size of the fibroids
Has been shown to produce a significant reduction in intraoperative blood loss (60 mL)
Pretreatment with GnRHa has not been shown to increase operative time
Has been shown to lead to significant reduction in postoperative hemoglobin (1.15 g/dL)
CONS:
Potential blurring of the cleavage plane between the myoma and the myometrium
Requires time for pretreatment (usually 3 months) and may lead to delay in surgery

2.2 Surgical Procedure

Consideration should be given to treating the most symptomatic fibroids first. In the patient with submucosal fibroids and heavy menstrual bleeding, a hysteroscopic resection should be performed first, followed by laparoscopic myomectomy. These procedures may be performed during the same operation.

Attempts should be made to remove all visible or palpable fibroids to prevent future growth and recurrence of symptoms.

Preoperative laboratory work should include a complete blood count, human chorionic gonadotropin type, and screening. For patients with significant anemia or large intramural fibroids, a type and cross of two units of blood should be available. For procedures for which significant blood

loss is a risk, the patient may consider having autologous blood available, or the surgeon can arrange to have cell saver technology available.

2.2.1 Consent

Once the surgeon has reviewed all imaging results, the patient should be extensively counseled about the risks of the procedure. Standard risks of bleeding, infection, adhesion formation, laparotomy, transfusion as well as organ injury should be discussed. Additionally, risks inherent in myomectomy, such as myoma recurrence, should be discussed. Up to 25 % of women may require additional surgery in the future for symptomatic myoma recurrence [8]. The risks of possible uterine rupture with future pregnancy and the need for cesarean section birth should be discussed.

Limited studies are available on the risks of uterine rupture. Generally speaking, the risk of rupture during pregnancy or during labor is 2.4 per 1,000 between 29 and 35.5 weeks [9]. To minimize this risk, it is recommended that the pseudocapsules of excised myomas be preserved for uterine anatomic and functional integrity, especially in women desiring future pregnancy. This can be done by limiting the use of diathermocoagulation and excessive suturing [9]. The surgeon may individualize his or her recommendation for delayed conception based on the extent and size of the fibroids. For example, a patient with a large pedunculated myomectomy may only wait 3 months for a procedure, whereas a patient requiring an extensive repair of the myometrium may wait 6 months [10].

2.2.2 Equipment

Needed instruments, sutures, and solutions in the operating room are key to a successful myomectomy. These necessary items include a single tooth tenaculum, myoma screw, and V-Loc suture (V-Loc, Covidien; Dublin, Ireland) or the surgeon's suture preference. A dilute vasopressin solution of 20 U in 100 mL of normal saline is helpful to decrease intraoperative blood loss [11, 12]. The surgeon should plan a method of morcellation and have needed equipment available.

Table 2.3 Optional equipment

Dilute vasopressin solution
Red rubber catheter to use as a tourniquet
Single tooth tenaculum
Myoma screw
Suture (polydioxone, polyglactin, or an absorbable barbed suture on a CT 1 or GS 21 needle)
Morcellator or self-retaining retractor for minimally invasive morcellation (see Fig. 2.11)

2.2.3 Patient Positioning and Port Placement

The patient is placed in the dorsal lithotomy position in Allen stirrups, arms tucked, and a Foley catheter is placed. A uterine manipulator that can antiflex and retroflex the uterus is helpful to assist with exposure when suturing. We use the reusable Valtchev uterine manipulator (Conkin Surgical Instruments; Toronto, Canada).

Use of the umbilical port is optimal for the camera, as this is cosmetically most appealing and serves as an excellent site to extend through the base for morcellation. This technique will be described later in this chapter. We typically place a 10-mm trocar in the umbilicus using the Hasson approach and use a 10-mm, 30-degree angled laparoscope. Other options include a flexible laparoscope or a variable-view laparoscope to allow more flexibility in available views. For straightforward fibroids, a 10-mm, zero degree laparoscope can be used. If the uterus extends above the umbilicus, placing the camera port above the level of the umbilicus in the midline may give greater exposure.

Additional port placement may be individualized based on the size and location of the myoma. Depending on the surgeon's training and preference, three accessory ports are generally needed. Options include placing two 5-mm ports on the primary surgeon's side and one on the assistant's side. It is important when placing two ports on

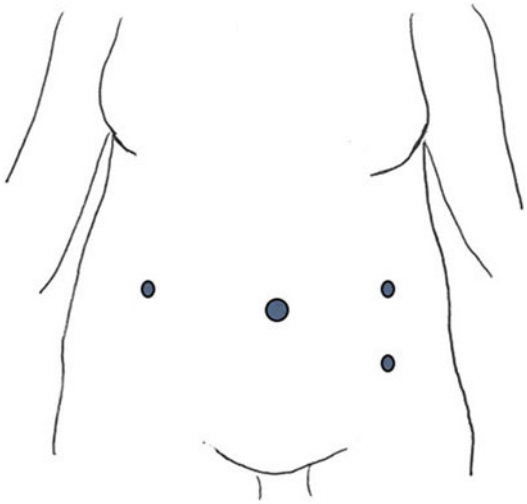

Fig. 2.3 Port placement for most uteri with myomas extending up to the umbilicus

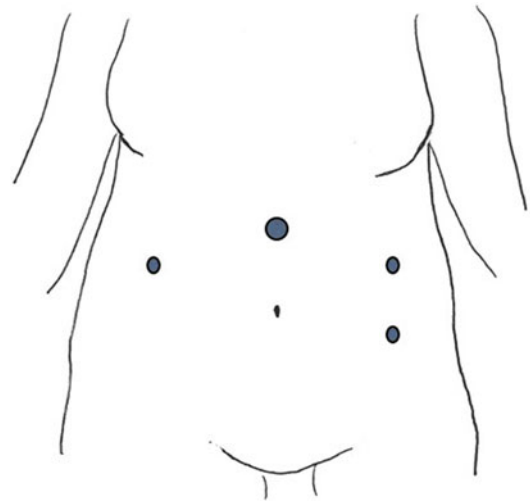

Fig. 2.4 Alternative port placement for large myomas extending above the umbilicus

the same side to place them at least a hands width (approximately 5–6 cm) apart from each other to prevent instrument clashing. The assistant's side port must be placed above the level of the uterus, since this is the port will be used to elevate and enucleate the fibroid out of the uterus.

CT-1 or GS 21 (V-Loc) needles are best for uterine repair and can be introduced and removed through the 10- to 12-mm trocar at the umbilicus. Other options include dragging the needle into the abdominal cavity on the swedge through a 5-mm skin incision. Another choice is replacing the suprapubic 5-mm trocar with a 10- to 12-mm trocar and introducing the needle directly through this port. This larger port site could also then be utilized for a disposable or reusable morcellator. It is important to close the fascia of any port that is 10 mm or larger.

2.3 Surgical Technique

Once pneumoperitoneum and port placement are obtained, the abdominopelvic cavity is explored. The uterus is carefully assessed and a comparison made with its appearance in preoperative imaging. The relationship of the myomas to the fallopian tubes and ovaries is assessed. In uteri with multiple fibroids, the most symptomatic myoma may be targeted first. There may be cases where the uterus must be debulked by removing smaller, less symptomatic fibroids to achieve better access to the primary fibroid. Generally, removing fundal fibroids first will afford greater access to lower uterine segment fibroids.

Formulating a plan for hemostasis is critical. Typically, bleeding from the myometrium adjacent to the myoma is anticipated until the entire defect is closed. The bleeding may be slow but constant. The nature of this slow, steady bleeding may be deceiving. Communication with the anesthesiologist is important to keep an accurate count of blood loss. A dilute vasopressin solution (20 U/100 mL normal saline) can help limit blood loss [9]. The site of injection depends on the type of myoma. For example, a pedunculated myoma should be injected at the myometrial base of the stalk of the myoma. An intramural fibroid can be injected through the uterine serosa, ideally in the plane just inside of the pseudocapsule, creating a "wheel" effect. This technique is more effective than deep myoma injection. With large intramural myomas, the deeper adjacent myometrium toward the base may be injected as it is exposed if excessive bleeding is encountered. Spot cautery with bipolar energy can be helpful for distinct vessels but its use is limited with bleeding from the raw surface of the myometrium. Excessive use of thermal energy for hemostasis is discouraged because this may increase destruction of healthy myometrial tissue and impair uterine healing and functionality [9].

For patients with extremely large intramural myomas (>10 cm) that would require multilayer closure, additional steps may be considered for preventing excessive blood loss. Some authors describe selective use of a laparoscopically placed tourniquet to compress the uterine arteries at the level of the cervix [10, 12]. This technique involves threading a red rubber catheter through bilateral windows created in the broad ligament encircling the cervix. The ends of the red rubber catheter are brought through the lateral trocar skin incisions on contralateral sides, outside of the trocar, and secured with Kelly clamps where they exit the port sites [10].

For women who have completed childbearing, permanent uterine artery occlusion, using clips, suture, or complete transection can be performed. Preliminary studies suggest that this technique can decrease intraoperative blood loss and may also help prevent fibroid recurrence [12].

Table 2.4 Tips for hemostasis

1. Vasopressin: inject a dilute solution in the plane just inside the pseudo-capsule, creating a "wheel" effect. Always alert the anesthesiologist prior to injecting.
2. Avoid injecting large surface myometrial vessels. If bleeding occurs at injection sites, hold temporary pressure with laparoscopic grasper to control and prevent extravasation of vasopressin.
3. For large myomas, if needed repeat injection to the myometrium that is adjacent to the deeper base of the myoma, always alerting the anesthesiologist first.
4. Consider the use of a tourniquet for large (>10 cm) myomas.
5. Targeted spot cautery to distinct vessels and avoid excessive coagulation to myometrial tissue.
6. If child-bearing is completed, consider permanent uterine artery occlusion methods as adjuncts for hemostasis

2.3.1 Incision

The incision type should be individualized based on myoma type and location. Injection with a dilute vasopressin solution is made. A transverse incision facilitates suturing from lateral ports and runs parallel to the arcuate vessels of the myometrium, limiting blood loss [10]. This initial incision can be made with ultrasonic or monopolar energy and must be to the level of the fibroid capsule and over the entire diameter. Generally speaking, the closer the incision is to the fundus over the myoma, the easier it will be to repair with traditional laparoscopy.

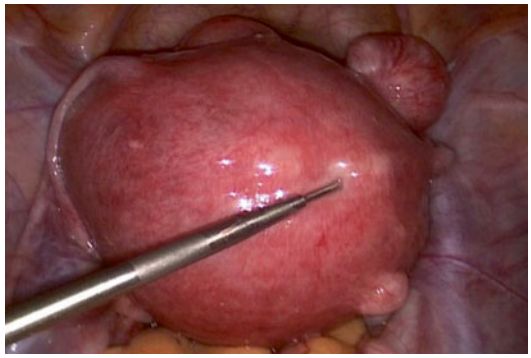

Fig. 2.5 Injection with a dilute vasopressin solution is made

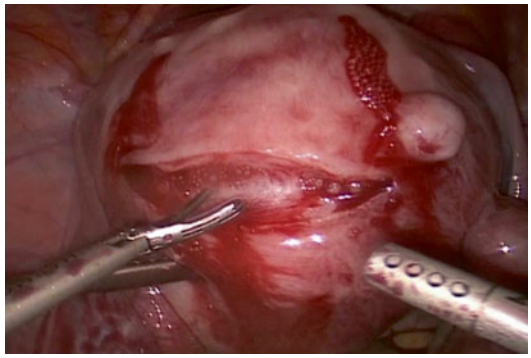

Fig. 2.6 Horizontal incision is made to the level of the pseudocapsule

Fig. 2.7 Injection of pedunculated myoma at the base of the stalk

Fig. 2.8 Excision of pedunculated myoma preserving a small serosal edge of tissue

2.3.1.1 Pedunculated Myomas

When excising pedunculated myomas, do not excise the stalk at the base of uterine surface. Rather, save a portion of the serosa of the stalk and excise the myoma only. Typically, the preserved serosa will immediately start to retract. Spot cautery can be attempted to achieve hemostasis but in the event of persistent bleeding, the preserved serosa will assist with suture closure and avoid tearing.

2.3.1.2 Intramural or Subserosal Myomas

With intramural and subserosal myomas, a horizontal incision is made over the entire length of the myoma to the capsule. Occasionally, with large intramural myomas or those lying in an oblique plane within the uterus, the entire length of the fibroid may not clear. In this case, the capsule that has been identified can be grasped with a single-tooth tenaculum. Elevating the

myoma away from the uterus while expanding the original incision can help delineate the exact size and location of the myoma.

2.3.1.3 Broad Ligament Myomas

With broad ligament myomas, the ureter should be identified and the relation to the operative sight noted. The incision is made over the length of the myoma to the capsule as described with an intramural fibroid. Once the capsule is exposed, grasping it with a single-tooth tenaculum and elevating the myoma away from the ureter and uterine artery with careful blunt dissection will keep the ureter safe. Care should be taken to limit the use of energy. Small vessels can easily be isolated with traction and countertraction while elevating the specimen out of the myoma bed and selectively sealing it.

2.3.1.4 Lower Uterine Segment

For intramural myomas in the lower anterior or posterior uterine segment, suture closure can be a challenge with traditional laparoscopy. The uterine arteries are also entering at this level. The initial horizontal incision is typically easier to repair if made toward the superior aspect of the myoma rather the center. As previously stated, the closer to the fundus an incision can be made, the more straightforward the repair will be while using traditional laparoscopy. As with any myomectomy, the dead space must be closed in a multilayered fashion. Use of a uterine manipulator that can anteflex and retroflex the uterus will be helpful for repair of these defects.

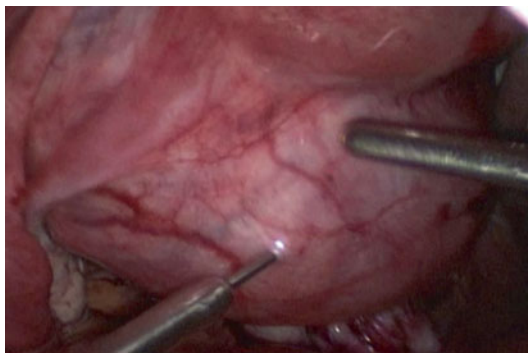

Fig. 2.9 Injection of a lower uterine segment fibroid above the midline diameter of the myoma, along the intended incision line

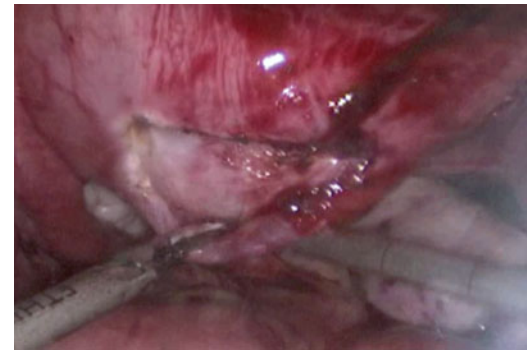

Fig. 2.10 Incision is made superior to the midline diameter of the myoma, and the myoma is lifted out of the incision to make suture repair more straightforward

2.3.2 Enucleation

Once the capsule of the myoma is exposed, one edge is firmly grasped with a single-tooth tenaculum or myoma screw. Myoma extraction is best accomplished through traction and countertraction. Traction and countertraction will delineate the natural tissue plane and identify vascular attachments that can then be selectively transected with energy. The removed myoma should be avascular and pearly white in appearance. The tenaculum or myoma screw should be replaced into the new edge of the myoma for successive enucleation. It is important never to "dig" or "carve" the myoma out of the uterus. The act of elevating the myoma out of the uterus will help avoid injury to the normal myometrial tissue and inadvertent entry into the endometrial cavity. This elevation is especially important with broad ligament myomas in order to avoid ureteral and uterine artery injury. All efforts should be made to remove all myomas detected to prevent future growth and recurrence of symptoms.

Few studies have examined the technique of laparoscopic myomectomy, and most surgeons have their own operative preferences. Some authors maintain that a myoma is anchored by a pseudocapsule that is formed by connective tissue bridges but lacks its own true vascular pedicle [9]. Macroscopic examination of

this tissue reveals parallel arrays of extremely dense capillaries and shows that larger vessels are separated from the myometrium by a narrow avascular cleft. Some myomas have a central vascular network that forms a pedicle. This fibrovascular bundle has been described as the "fibroid neurovascular bundle." These authors maintain that preserving this neurovascular bundle by performing an "intracapsular" myomectomy will have a favorable impact on uterine healing and functionality postoperatively [9].

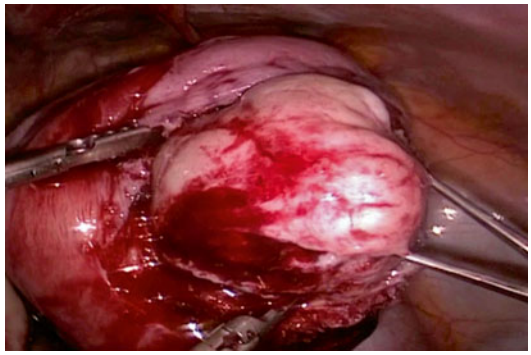

Fig. 2.11 Enucleation of the myoma is accomplished through traction and counter-traction

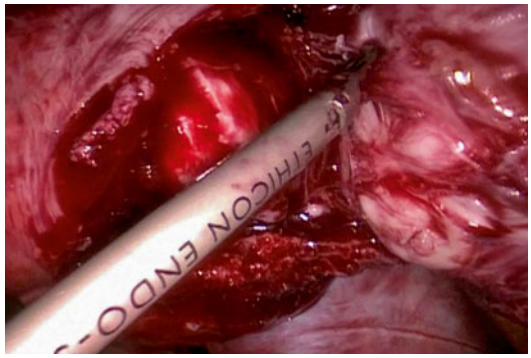

Fig. 2.12 Small vascular attachments are selectively ligated

2.3.3 Uterine Repair

Uterine defects should be closed in a multilayered fashion, eliminating all dead space. Use of a unidirectional, absorbable, barbed suture (V-Loc 180) on a GS-21 needle in a running fashion is extremely helpful. The barbed nature of the suture maintains tension evenly along the length of the defect and facilitates tissue reapproximation by compressing the uterine defect as it is closed, a task that was previously required of the surgical assistant. For large myometrial defects, the muscle fibers will immediately start to contract down. It is not advisable to trim what may seem like redundant tissue as this may be needed for closure to decrease tension on the suture line. Extreme tension may cause the suture to tear through the normal myometrial tissue with increased bleeding and impaired closure. The same multilayered closure that would be performed via open laparotomy should be performed laparoscopically. When closing the serosal layer, an effort should be made to minimize the amount of exposed serosal suture, as in open myomectomy.

If the endometrial cavity is entered, the endometrium is reapproximated with a rapidly dissolving suture like 2-0 Monocryl (Ethicon Inc., San Angelo, TX). Place successive layers over the endometrium with the barbed suture, taking care not to allow the needle to pass through the endometrium. Some surgeons recommend using a balloon stent in the intrauterine cavity that is removed 2 weeks postoperatively. Additionally, they recommend using estradiol 1 mg twice a day for 4 weeks followed by 10 days of progesterone. Postoperative hysteroscopy, sonohysterogram, or hysterosalpingogram can be performed to evaluate the endometrial cavity [10].

If the surgeon is just starting to perform laparoscopic myomectomies, suturing may be a challenge, particularly at lower uterine segment locations or with large defects. In the event of excessive blood loss, where the surgeon feels

the suture repair should be expedited, a 3-cm suprapubic horizontal skin incision can be made. To maximize exposure, the fascia is transected in a vertical fashion, resulting in a "cruciate" incision, and a self-retaining retractor, like the Alexis (Applied Medical, Santa Margarita, CA), is placed. This incision can easily be displaced to expose the uterine defect, which can then be brought to the surface for open closure. For posterior lower uterine segment defects, this incision may need to be enlarged for greater exposure. By bringing the uterine incision up to the surface, the bowel does not need to be displaced mechanically. These patients typically recover on the same time line as those with laparoscopic repair.

Preserving the hypertrophied myometrial tissue does not always leave the most cosmetically acceptable surgical appearance at the conclusion of the case, but full preservation is important for future uterine functionality. Postoperative ultrasound studies have shown significant reduction of the uterine scar from 78 % of the previous myoma location on the first day, to 19 % on the 30th day, and less than 4 % on the 45th day [13]. However, depending on what type of suture is used in repair, imaging with ultrasound at 6 weeks often demonstrates artifact from partially dissolved sutures, especially if the patient had a multilayered closure. Therefore, postoperative imaging should be delayed until 3 months for a clearer picture of complete healing. Imaging at 3 months postoperatively will demonstrate the amazing contractile properties of the uterine muscle as it resembles a normal shape.

Myomas should be collected and counted either in the right upper quadrant or cul de sac to ensure complete evacuation from the peritoneal cavity. The use of an intraperitoneal drain removed postoperatively has not been well studied. Use of a drain is helpful in removing postoperative serous drainage. It could also alert the physician to the rare occurrence of significant postoperative bleeding. In our current practice, we use a Jackson-Pratt drain for our larger intramural myomectomies (>10 cm), exiting through one of the 5-mm lateral port sights; the drain is removed on postoperative day 1.

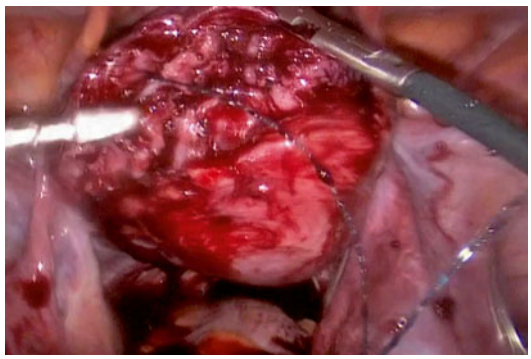

Fig. 2.13 Dead space is closed to prevent hematoma formation

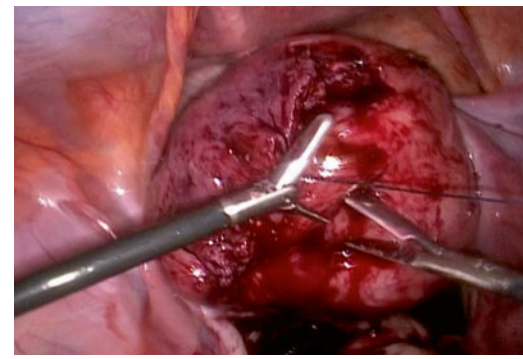

Fig. 2.15 Serosal edges are reapproximated

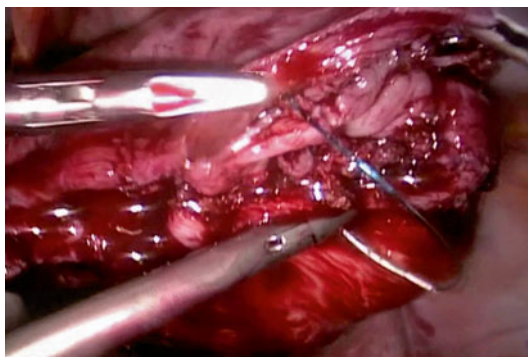

Fig. 2.14 Multilayered closure is performed

Fig. 2.16 Hemostasis is achieved with suture closure

2.3.4 Morcellation and Removal

A variety of techniques have been described for myoma removal. Removal can be accomplished with one of the disposable morcellators under direct vision. These often require extending one of the 5-mm trocar sights to a 12- to 15-mm incision. Alternatively, the umbilical port site may be extended to 2 cm through the natural creases of the umbilicus within the basin. This is the same technique often recommended for placement of a single-incision laparoscopic port and produces an excellent cosmetic result. Fascia and peritoneal layers are also extended, and a self-retaining retractor is placed for direct tissue extraction using a No. 10 blade on a long handled scalpel. This method is preferred in our practice for quick and efficient tissue removal. When using a cold knife, the No. 10 blades can easily and inexpensively be replaced when they dull, as is commonly encountered with calcified or large fibroids. Pneumoperitoneum is lost with this open morcellation technique, and therefore all fibroids must be accounted for before removal. Smaller fibroids, if multiple, can be placed into an endobag and retrieved through this same extended umbilical incision. Care should be taken to remove all myoma fragments, as postoperative disseminated leiomyomatosis has been extensively described [14].

Careful examination of the operative sight after morcellation should reveal excellent hemostasis. Spot cautery or additional sutures may be needed at the surgeon's discretion. Adjuvant agents, like Floseal (Baxter International Inc.; Deerfield, IL), may be helpful for oozing from the serosal suture lines.

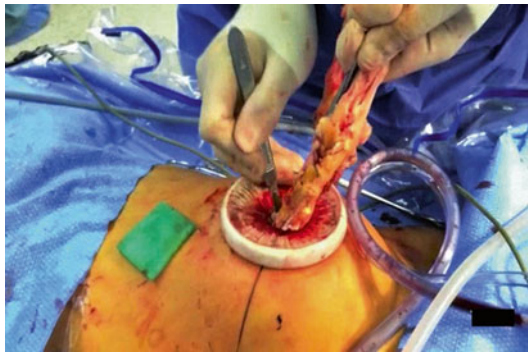

Fig. 2.17 Morcellation is accomplished efficiently using a 2-cm incision in the basin of the umbilicus with a self-retaining retractor

2.3.5 Adhesion Prevention

Adhesion formation after surgery should be considered the most common complication of gynecologic surgery, and myomectomy is well known to have a significant risk of postoperative adhesions formation [15]. Complications of postoperative adhesions include bowel obstruction, pelvic pain, and infertility. National [15, 16] and multinational [17] guidelines on best practices for reducing adhesion formation include the following recommendations: (1) surgeons should attempt to perform procedures using the least invasive method possible; (2) meticulous surgical technique should be employed, including minimizing tissue trauma and achieving optimal hemostasis; and (3) the use of adhesion prevention barriers should be considered after procedures at high risk for postoperative adhesions such as myomectomy.

Three barriers have been well studied in randomized trials [17] that are widely commercially available: polytetrafluoroethylene or Gore-Tex (W.L Gore & Associates; Flagstaff, AZ), oxidized regenerated cellulose or Interceed (Ethicon EndoSurgery Inc.; Blue Ash, OH), and modified sodium hyaluronate/carboxymethylcellulose or Seprafilm (Genzyme Corporation; Boston, MA). Gore-Tex was superior to no treatment and to Interceed in preventing adhesions, but its usefulness is limited by the need for suturing and later removal [16, 18]. Interceed was associated with a reduction in postoperative adhesions [7] but should not be used if there is ongoing risk of bleeding [16]. Seprafilm has been shown to reduce postoperative adhesions, especially after myomectomy [16]; however, there are few data on the benefits of long-term clinical outcomes such as bowel obstruction, pelvic pain, or fertility. No significant adverse events have been reported with these barriers, though none has emerged as a panacea for adhesion prevention.

Seprafilm has been used laparoscopically by creating a slurry [19], although its use in this form has not been well studied on adhesion prevention in gynecologic surgery. Further studies of commercial adhesion prevention and barrier methods that evaluate long-term clinical outcomes are needed.

Table 2.5 Advantages and disadvantages or adhesion prevention barriers

	Advantages	Disadvantages
Gore-Tex (polytetrafluoroethylene)	Most effective barrier when compared to others in laparoscopy or laparotomy.	Need for suturing in place and later removal.
Interceed (oxidized regenerated cellulose)	Shown to be effective in reducing adhesions and relative ease of use.	Should not be used if blood or bleeding risk is present.
Seprafilm (modified sodium hyaluronate/carboxymethycellulose)	Shown to reduce adhesion risk after myomectomy by laparotomy.	Not well studied laparoscopically in gynecologic surgery. Off-label use in slurry form.

Conclusion

Laparoscopic myomectomy has significantly improved patient morbidity and remains the ideal treatment for symptomatic patients desiring future fertility. Large studies are needed to accurately evaluate the advantages and disadvantages of the many variants in technique of each step. Again, no data exist on the amount of time a couple should wait to conceive after the surgery, but most surgeons would recommend waiting 6 months [10].

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