MASTER CLASS

Laparoscopic Myomectomy

CATHERINE COOPER NELLIST

In this month's installment of the Master Class in Gynecologic Surgery, we are taking an interesting twist and featuring the expertise of our own medical editor, Dr. Charles E. Miller, an internationally renowned expert in minimally invasive gynecologic surgery.

When Dr. Miller inaugurated this column more than 7 years ago with a feature on "Maximizing Myomectomy" (OB.GYN. NEWS, Feb. 1, 2004, p. 30), he launched us into a successful, widely read series of Master Class features that have educated and inspired our readers.

In his opening Master Class feature, Dr. Miller detailed the advantages of laparoscopic myomectomy and shared some pearls he acquired from a retrospective study of almost 300 laparoscopic myomectomy patients whom he had managed. He advised us on patient selection, presurgery planning, port placement, equipment, and key components of surgical technique.

At this point, laparoscopic myomectomy is a procedure that Dr. Miller has been performing for more than 20 years. And as he tells us here, it is a procedure that is still evolving and one that – even more so than in the past – should become a more common technique in the armamentarium of the minimally invasive gynecologic surgeon.

Laparoscopic myomectomy is one of Dr. Miller's key research and practice concerns. In this Master Class, he gives us a valuable update. He explains how he has honed his selection of diagnostic tools for preoperative evaluation, and details how to minimize blood loss and the risk of adhesions and hematoma formation. He also provides some suturing pearls and weighs in on the role and use of recently introduced barbed sutures.

–Catherine Cooper Nellist
Managing Editor of OB.GYN. NEWS

The Ever-Changing Laparoscopic Myomectomy

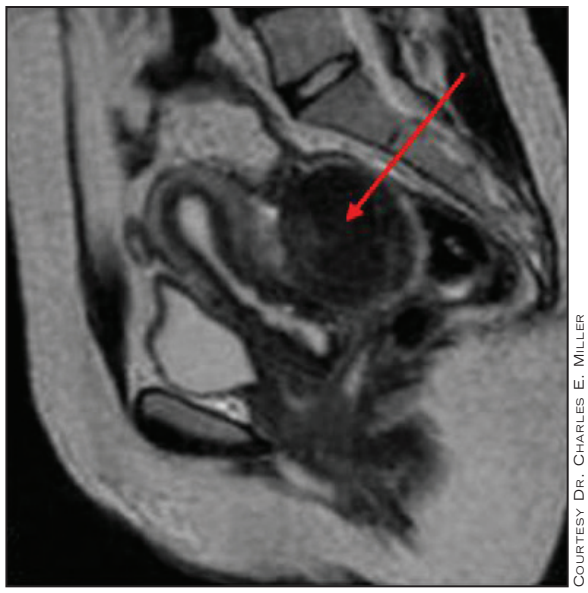
CHARLES E. MILLER, M.D.

A successful laparoscopic myomectomy begins with the correct assessment of the size, number, and location of the myomata inside the uterus. In the past, I have recommended multiple techniques for evaluation, including hysteroscopy, two-dimensional (2-D) ultrasound (transvaginal, transabdominal), 3-D ultrasound (transvaginal, transabdominal), the 2-D saline infusion sonohysterogram (2-D SIS), the 3-D SIS, and magnetic resonance imaging (MRI).

At this juncture, because of improved diagnostic acumen, I now recommend MRI or saline infusion sonography. MRI (Figure 1) is an excellent diagnostic tool as long as the interpreting radiologist is willing to account for the number, location, and size of all the fibroids. Moreover, there appear to be advantages of the saline infusion sonogram over the routine transvaginal or transabdominal ultrasound. (See Figure 2.) When the myometrial walls of the uterus are separated with saline, endometrial visualization is enhanced, which both allows the location of various focal endometrial abnormalities to be discerned and improves the physician's ability to decide whether the fibroid is submucosal, impinging, intramural, or subserous.

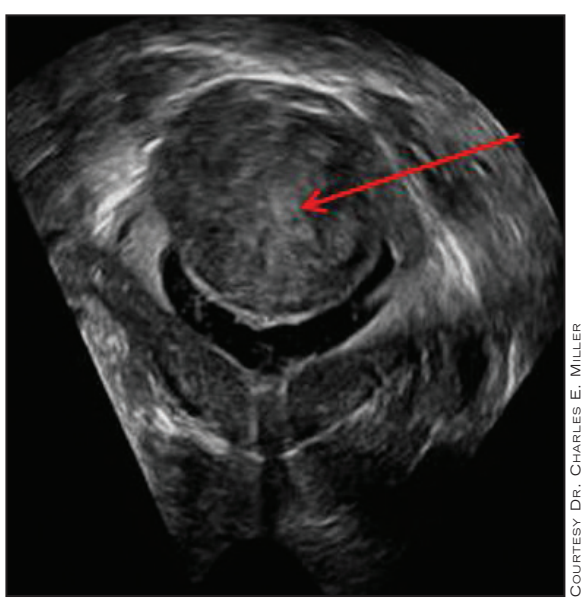
In my estimation, the 3-D saline infusion sonogram is superior to 2-D evaluation. The ability to render a three-dimensional image – and thus manipulate the ability to visualize the saline infusion sonogram image further – enhances fibroid mapping.

Although the saline infusion sonohysterogram is far better for evaluating uterine leiomyomata than is the hysterosalpingogram, the technique does not allow evaluation of the fallopian tubes. Recently, I helped launch Femasys Inc.'s Femvue System (Figures 3 & 4), which uses an admixture of saline and air to assess fallopian tube patency. Three-dimensional saline infusion sonography with Femvue evaluation of the fallopian tubes is now my routine evaluation of the pelvis prior to laparoscopic myomectomy. Especially if metrorrhagia is noted, an endometrial biopsy is performed at the completion of the procedure.



Courtesy Dr. Charles E. Miller

Figure 1. MRI is an excellent diagnostic tool. This MRI shows a posterior subserosal uterine fibroid.

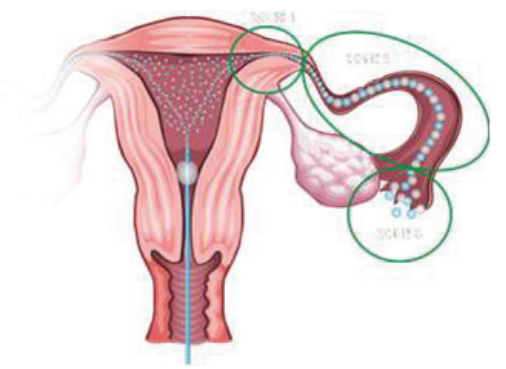


Courtesy Dr. Charles E. Miller

Figure 2. Saline infused sonohysterogram shows a large fundal fibroid.

Courtesy Femasys

Figure 3. The Femvue device uses an admixture of saline and air to assess fallopian tube patency.



Courtesy Femasys

Figure 4. This artist rendering shows fluid exiting through patent fallopian tubes.

This testing does not, however, diminish the importance of physician examination prior to surgery. Through the physical exam, the minimally invasive gynecologic surgeon is able to determine how large the uterus/leiomyomata complex is, relative to the patient's size, and therefore where ports should be placed, as well as the potential difficulty of surgery. If the surgeon considers the uterus/leiomyomata complex too large, or if anemia is noted, a gonadotropin-releasing hormone (GnRH) agonist can be given for 3 months to attempt shrinkage of the leiomyomata or to enable hemoglobin to rise (through the resultant amenorrhea) prior to surgery.

Laparoscopic Myomectomy

The laparoscopic surgery is scheduled in the proliferative phase of the cycle to avoid thickened endometrium. This is especially important in the case of removal of a type II submucosal leiomyomata or one that is impinging on the endometrial cavity.

On the day of surgery, prior to the laparoscopic myomectomy and after the patient has been placed into the dorsal lithotomy position and a Foley catheter has been placed in the bladder, hysteroscopy is performed to treat any abnormalities that are seen within the endometrial cavity. This may include hysteroscopic myomectomy on a leiomyomata previously believed to be located away from the endometrial cavity.

Once hysteroscopy has been completed, a uterine manipulator must be placed inside the uterine cavity. It is imperative to utilize a manipulator that can be placed deep enough into the cavity to enable anterior/posterior and lateral uterus flexion. I consider this function to be so important for the success of laparoscopic myomectomy that a surgical assistant, standing between the patient's legs, continues to manipulate the uterus throughout the duration of the procedure.

Generally, the 5-mm laparoscope is placed initially through the umbilicus, unless periumbilical adhesions are anticipated. In this latter case, I proceed to make a left-upper-quadrant incision. Lateral ports are then placed under

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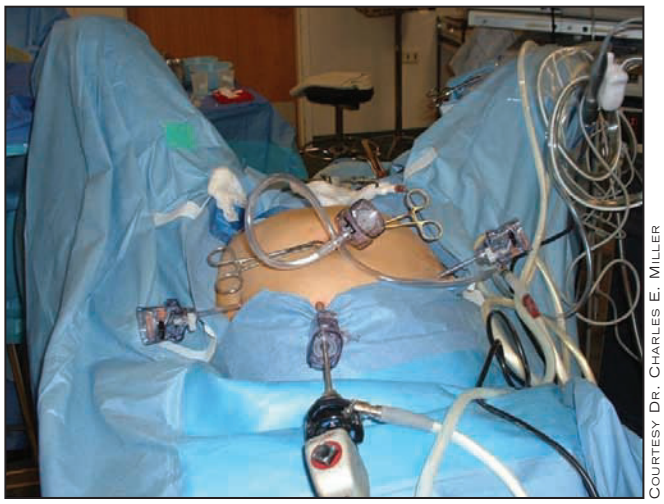
direct visualization. These ports must be placed above and lateral to the uterus fibroid complex (See Figure 5.) Next, the pelvis is inspected; when necessary, associated pathology is removed prior to proceeding to myomectomy.

To minimize blood loss, a dilute solution of vasopressin (30 U of vasopressin in 100 cc of normal saline) is placed in the myoma bed via an 18-gauge spinal needle placed percutaneously through a small skin nick. (See Figure 6.)

If the myoma is pedunculated, on a broad base, the vasopressin should not be placed into the pedicle itself, as bleeding can be excessive; rather, the vasopressin is placed in the uterus around the pedicle. It is imperative to aspirate prior to injection of vasopressin in order to prevent inadvertent intravascular injection of the vasopressin.

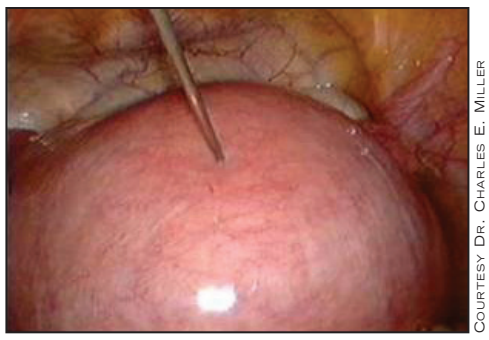


Courtesy Dr. Charles E. Miller

Figure 5. When leiomyomata are greater than or equal to an 18-week size uterus, ports are placed at the umbilicus and above.

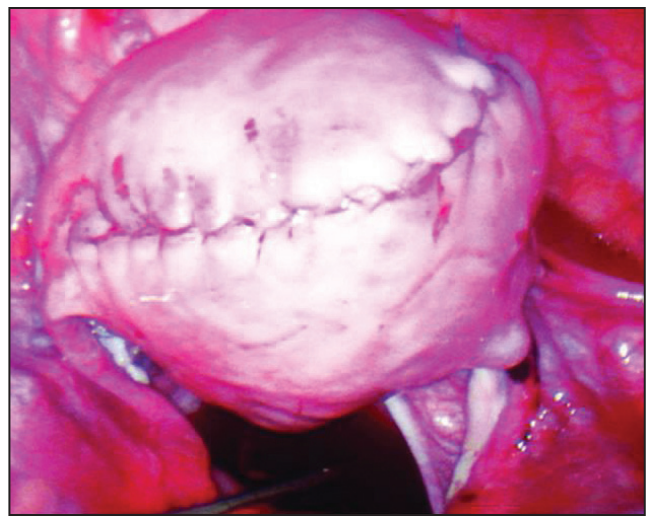
If possible, to reduce the risk of adhesions, make an anterior incision in the uterus and try to remove as many fibroids through the single incision as possible. For years, my instrument of choice has been the curved blade of Ethicon Endo-Surgery Inc.'s Harmonic Scalpel. Harmonic energy allows excellent cutting with minimal tissue desiccation. Moreover, the curve of the blade allows easier dissection between the myoma and myometrium. When a posterior incision is required, I use a vertical incision to decrease risk of adhesion formation near the adnexa.

If multiple fibroids are removed, I place a #1 nylon suture with a Keith needle transcutaneously into the pelvis. The numerous leiomyomata are then strung on this suture to avoid losing a myoma in the abdomen or pelvis. (See Figure 7.) Furthermore, if visualization becomes obscured upon dissection of a large leiomyomata, the mass can be morcellated in part while it is still in utero.



Courtesy Dr. Charles E. Miller

Figure 6. To minimize blood loss, vasopressin is injected percutaneously utilizing an 18-gauge spinal needle.



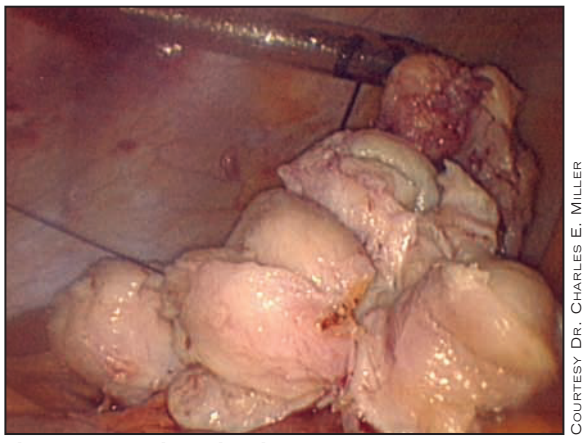
Courtesy Dr. Charles E. Miller

Figure 8. Note the minimal visible suture in this completed repair of the uterus using the "baseball stitch."

Although suturing in the "vertical zone" (with two ports placed on the same side of the pelvis) has become a popular technique, I continue to profess cross-table suturing. When the surgeon stands cephalad to the incisions, the repair is quite comfortable to perform. Furthermore, the ports can be placed higher on the abdomen to accommodate the very large uterus, and can be positioned more widely apart to improve triangulation.

I have always recommended multiple-layer closure of the uterus to minimize hematoma formation, and have advised skimming the myometrium rather than taking deep bites of tissue in order to minimize tissue destruction. When I began to perform laparoscopic myomectomy in earnest more than 20 years ago, closure of the uterine cavity was performed with Ethicon Inc.'s non-braided PDS II 3-0 suture placed in an interrupted or mattress style using a "knot pusher."

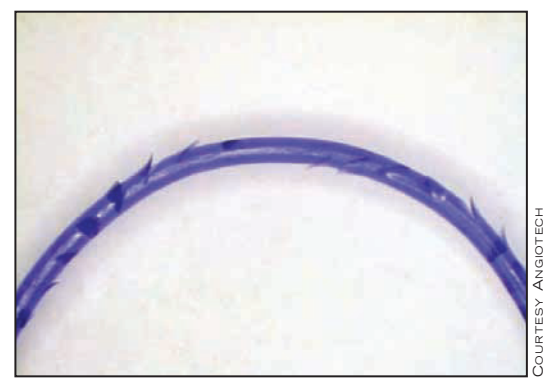
Even now, when the endometrial cavity is entered at the time of myomectomy, this is the technique I currently recommend, with the interrupted or mattress sutures placed immediately above the endometrium. During the past 15 years, I have advised repairing the uterus via a running-suture technique. After multiple layers are placed, the two suture ends are tied together via an intracorporeal suture technique. This has not only proved to be more efficient, but also allows the various layers to collapse upon themselves. Ultimately, the serosa is repaired via a baseball closure (suture placed in to out, in to out, and so on). (See Figure 8.) This minimizes exposed suture on the serosa, and thus adhesion formation secondary to foreign material.



Courtesy Dr. Charles E. Miller

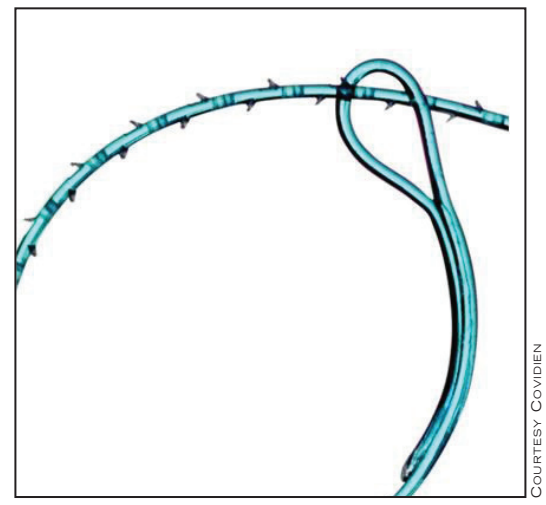
Figure 7. Multiple fibroids are strung on a suture in order to prevent loss in the abdomen during an extended multiple myomectomy procedure.

In my opinion, the recent introduction of barbed sutures has served as a monumental advance in our ability to repair the uterus in multiple layers. Both Covidien's V-Loc and Angiotech Pharmaceuticals Inc.'s Quill sutures do not have to be tied. Moreover, the barbs enable consistent tension on the suture line. In order to secure the suture from slipping, the Quill uses a bidirectional barb (See Figure 9), whereas the V-Loc uses a unidirectional barb but secures the proximal end through placement of the needle through a pretied loop. (See Figure 10.) Upon completion of the repair, simply reverse the suture direction.



Courtesy Angiotech

Figure 9. The Quill bidirectional barbed suture helps repair the uterus in multiple layers.



Courtesy Covidien

Figure10. The V-Loc suture uses a pre-tied loop to secure the proximal end.

My current barbed suture of choice is the 3-0 V-Loc, which is created from 2-0 suture. When a barbed suture is used, it is imperative that the physician "hide" the suture as much as possible and thus use a baseball closure; theoretically, the barbs could catch bowel or omentum, leading to adhesion formation.

To allow for a better cosmetic repair and to minimize the risk of postoperative hernia, I recommend utilizing a larger umbilical incision for tissue extraction – I use a 12-mm umbilical port – while maintaining other ports at 5 mm. At the conclusion of the uterine repair and after placement of an anti-adhesive barrier (Ethicon Inc.'s Interceed), the umbilical port is removed. Large cervical dilators are then used to stretch the umbilical incision to allow direct placement of the 15-mm morcellator. Currently, I use Karl Storz Endoscopy America Inc.'s Storz Rotocut Morcellation System. This morcellator is reusable to decrease costs, and it has a beveled tip to enhance the "apple peel" shaving of the fibroid, a very durable blade to maximize cutting ability, and variable speed to enhance the morcellation procedure.

With this laparoscopic technique, I utilize laparotomy in fewer than 1% percent of more than 200 myomectomy cases per year, of which more than 30% involve fibroids greater than 8 cm and of which nearly 20% involve five or more fibroids.

Major complication rates continue to be fewer than 1% percent, and heterologous transfusions occur in fewer than 0.5% of cases.

More than 20 years after its inception, laparoscopic myomectomy continues to be an evolving procedure – one that, especially with current advancements, should become a more common technique in the armamentarium of the minimally invasive gynecologic surgeon.

Dr. Miller disclosed that he is a consultant for Covidien and Femasys Inc., and a consultant and speaker for Ethicon Endo-Surgery Inc. ■

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