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The "Cons" of Laparoscopic Myomectomy in Women Who May Reproduce in the Future

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INTRODUCTION

LEIOMYOMAS ARE SEEN WITH INCREASing frequency during the later reproductive years [1]. The trend toward delaying childbearing beyond the third decade of life has, therefore, resulted in myomas as a growing medical problem in women attempting to conceive [2].

Laparoscopic myomectomy (LM) has been performed successfully by us [3] and others [4,5], and may offer patients some of the known advantages of laparoscopic surgery, including lower immediate postoperative morbidity and rapid convalescence. However, despite the proven feasibility of the laparoscopic approach, serious concerns remain, especially for women interested in future pregnancies.

The risk of a future uterine rupture is a major concern following any operation involving the myometrium [6]. The difficulties of adequately closing all layers laparoscopically and using electrocoagulation for hemostasis may contribute to the risk of uterine rupture [7,8].

Uteroperitoneal fistulas may follow LM because meticulous laparoscopic approximation of all layers is difficult, if not impossible [8,9]. The use of electrocoagulation for hemostasis inside the uterine defect may also increase the risk of uteroperitoneal fistula formation.

Postoperative adhesions increase when sutures are placed in the serosal layer [3,9]. A single uterine incision for removing multiple leiomyomas and subserosal approximation of the uterine defect is advised.

A combination of laparoscopy and minilaparotomy may alleviate some of these problems [7,8]. The simpler procedure and reduced operative time will enable more gynecologists to apply this technique. The uterine closure also is improved when a minilaparotomy is used for conventional suturing in two or three layers, thereby decreasing the possibility of uterine dehiscence, fistulas, adhesions and bleeding. Pelvic observation during the laparoscopic portion of the procedure allows the diagnosis and treatment of associated endometriosis or adhesions and also planning the type of uterine incision(s).

LAPAROSCOPIC MYOMECTOMY

Subserosal and intramural myomas <5 cm can easily be mansged laparoscopically. However, larger lesions, particularly if they are intramural, require prolonged morcellation and laparoscopic suturing of the uterine defect. The largest reported myomas removed by laparoscopy were 15 to 16 cm [3,4], and one group reported that 10 cm was their limit [5]. Both laparoscopic morcellation and myometrial suturing are difficult, and prolong operations. Previous studies [3,4] have underscored the need to decrease the operative time of LM.

Even under ideal circumstances, laparoscopic closure of the myometrial defect is difficult at pre-

sent. Approximating the edges of the defect often requires a considerable amount of force. Through the laparoscope, this degree of tension is difficult to achieve without tearing the tissue. Often, the result is increased bleeding, or a defect with significant gaps. This aspect of the procedure is may be lengthy and difficult and may lead to endometrial serosal fistula formation. Meticulous suturing of several layers is almost impossible. In a series of 154 laparoscopic myomectomies, 6 uterine fistulas developed [8]. In three women, the uterine defect was sutured, and in three it was not. In another report, a woman underwent laparoscopic myomectomy to remove a 3 × 2 cm fibroid [9]. She did well following surgery, and conceived 3 months postoperatively. At 34 weeks' gestation, she experienced uterine dehiscence at the site of the myomectomy and had an emergency cesarean. Dubuisson et al [10] reported two cases of uterine rupture during pregnancy following laparoscopic myomectomy.

None of the available lasers, regardless of the power setting or focus of the beam, adequately coagulate myometrial bleeding vessels. The bipolar electrocoagulator is excellent for this purpose. The endocoagulator is an alternative for hemostasis, but the effect is quite slow.

REMOVAL OF THE MYOMA FROM THE ABDOMEN

Removal of leiomyoma(s) from the abdominal cavity is one of the most time-consuming aspects of the procedure, and no methods or instruments are suited ideally to this purpose. Different methods of removal include the use of claw-toothed forceps inserted through a 10-mm sleeve for myomas 5 cm or less in size. Alternatively, the trocar sleeve is removed and a long Kocher clamp inserted through one of the suprapubic incisions. The midline incision is preferred to avoid injury to the inferior epigastric artery, and the technique is quick. However, the suprapubic incision often must be extended. Larger myomas are removed through a posterior colpotomy [11,12], which can increase operative time and infectious morbidity, as well as risk of bowel and ureteral injury. In women with concurrent posterior cul-de-sac pathology, colpotomy is not safe. Medium and large myomas are morcellated using a morcellator, scalpel, or scissors. The process may be time-consuming, and may be ineffective for reducing calcified myomas. The recent development of an electric morcellator may reduce the time and difficulty of myoma removal [13].

LAPAROSCOPICALLY ASSISTED MYOMECTOMY

As a safe alternative to LM, laparoscopically assisted myomectomy (LAM) is a less technically difficult procedure and may require less time to complete. A decrease in operative time is a benefit of removing the myomas from the abdomen through a minilaparotomy incision. Further, the risk of uterine rupture is lowered by suturing the uterine defect in layers and avoiding excessive electrocoagulation.

The decision to proceed with LAM usually is made in the operating room after the diagnostic laparoscopy and treatment of associated pathology are completed. The criteria for LAM are myoma >5 cm or numerous myomas requiring extensive morcellation, deep intramural myoma, and removal that requires uterine repair in several layers with sutures [7].

LAM, with conventional morcellation and suturing through the minilaparotomy incision, reduces the duration of the operation and the need for extensive laparoscopy experience. In comparing LM and LAM, similar mean operating times for both techniques were noted despite larger myomas and their intramural positions, adjunctive laparoscopy, and the larger incisions of the LAM patients [7,8].

The main objectives of LAM are minimizing blood loss, preventing postoperative adhesions, and maintaining uterine wall integrity.

MINIMIZING BLOOD LOSS

Significant intraoperative blood loss can occur during the excision of subserosal and intramural leiomyomas. Depending on the tumor size and location, preoperative autologous blood donation is suggested. Patients are counseled regarding the consequences of intraoperative and postoperative bleeding and the possible need for a laparotomy. For anemic patients, preoperative treatment with a GnRH analog may enable restoration of a normal

hematocrit, decrease the size of the myomas [14], and reduce the need for transfusion [8,15]. Intraoperatively, the use of dilute vasopressin helps to minimize blood loss. Vertical uterine incisions bleed less than transverse incisions.

The leiomyoma, or in cases of multiple myomas, the most prominent one, is injected at its base with 3 to 7 mL of dilute vasopressin (10 units in 100 mL of normal saline). A vertical incision is made over the uterine serosa and extended until the capsule of the leiomyomas is reached. Any cutting modality that the surgeon prefers may be used. A corkscrew manipulator inserted into the leiomyomas is used to elevate the uterus toward the midline suprapubic puncture. With the manipulator attached to the myoma, the midline 5-mm puncture is enlarged to a 4- to 5-cm transverse skin incision. The fascia is incised transversely and the rectus muscle divided using a modified Maylard technique and monopolar electrode. The peritoneum is entered transversely.

The leiomyoma is brought to the minilaparotomy incision with the corkscrew manipulator, and the uterus is raised with the uterine manipulator. The corkscrew manipulator, still holding the leiomyoma, is replaced with two Lehey tenacula, and the leiomyoma is morcellated and removed. If possible, the uterus is delivered through the minilaparotomy incision to complete the repair. We remove as many leiomyomas as possible through a single anterior uterine incision. When the leiomyomas are in different locations and identification is not possible, the minilaparotomy incision is closed with two or three Allis clamps. The laparoscope is reintroduced, and the above steps repeated.

Posterior leiomyomas, which are difficult to reach via the minilaparotomy incision, are removed or mobilized laparoscopically to allow uterine exteriorization through the minilaparotomy incision. The uterus is reconstructed in layers using 3-0 and 0 polydioxanone sutures; the serosa is not sutured. The uterus is palpated to ensure that leiomyoma excision was complete.

The fascia is closed with a running polyglactin suture, and the skin is closed in a subcuticular fashion using polyglactin suture. The laparoscope is used to evaluate the uterus and assure final hemostasis. The pelvis is evaluated to detect and treat endometriosis and adhesions previously obscured by leiomyomas. Copious irrigation is performed, and blood clots are removed. We apply an absorbable fabric of oxidized regenerated cellulose to cover the suture line and wrap the uterus.

We evaluated this procedure in a series of 57 women. Each patient had one or multiple leiomyomas; two women also had uterine adenomyosis. Thirty-two (56%) women had associated endometriosis or adhesion, which required enterolysis in 9 (16%). No patients were excluded from the study after the decision to proceed with laparoscopically assisted myomectomy was made intraoperatively, and no procedures were converted to full laparotomy. The uteri ranged from 8 to 26 weeks in gestational size. Leiomyoma weight ranged from 28 g to 998 g (mean 247 g), operative time from 40 to 285 minutes (mean 127 minutes), and blood loss from 50 to 1600 mL (mean 267 mL).

The patients were usually discharged from the hospital the day of surgery or the morning of postoperative day 1.

In a 3- to 24-month follow-up (mean, 11.35 months; median, 9 months), all women with menometrorrhagia reported improvement of their symptoms. Four women who were infertile and whose preoperative infertility workup was otherwise negative, conceived between 6 and 9 months postoperatively. Three women had full-term pregnancies with normal vaginal deliveries. One woman had a cesarean at 34 weeks because of preterm labor. Two women who had no infertility complaint had full-term pregnancy with vaginal delivery. When we compared the results of LAM with those of myomectomy by laparoscopy and laparotomy, we found favorable results with the laparoscopy-assisted technique (Table I).

SUMMARY

Several concerns must be addressed before LM will be accepted in place of laparotomy. Uterine healing and the extent of adhesion formation associated with laparotomy must be compared with those associated with the laparoscopic approach in which sutures are used. Women of childbearing age who require a myomectomy for an intramural fibroid should undergo either an abdominal myomectomy or a modified laparoscopic procedure to ensure proper closure of the myometrial defect. The laparoscopic approach is appropriate for pedunculated or subserosal fibroids when myometrial closure does not affect uterine bleeding.

TABLE 1
Summary of results by number of patients per procedure [7].

	LAM *57 pts.* *mean ±S.E.M.*	*LM* *64 pts.* *mean ±S.E.M.*	*Lapt* *22 pts.* *mean ±S.E.M.*	*P(LM)* *P(Lapt)*
Leiomyoma weight (g)	247 ± 30.1	58 ± 7.16	337 ± 77.4	P(LM) <.00001 P(Lap) = 0.27
Uterine size (wks)	12–26	8–14	10–24	
Operative time (min)	127± 7.62	136 ± 9.6	134 ± 9.95	P(LM) = 0.36 P(Lapt) = 0.59
Blood loss (mL)	267 ± 54.4	143 ± 35.6	245 ± 56.1	P(LM) = .0068 P(Lapt) = 0.78
Postoperative hospital stay (days)	1.28	0.91	3.3 ± 0.39	P(LM) = .0141 P(Lapt) = .00004
Days to resume normal activity	12.2	11.2	39.2	P(LM) = 0.43 P(Lapt) < .0001
Days for complete (100%) recovery	23.1	20.9	70	P(LM) = 0.41 P(Lapt) = .0002

LAM = laparoscopically assisted myomectomy; LM = laparoscopic myomectomy; Lapt = myomectomy by laparotomy.
P(LM) compares LAM and LM.
P(Lap) compares LAM and myomectomy by laparotomy.

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