In the last edition of the Master Class in gynecology, Dr. Javier Magrina, professor of ob.gyn. and director of the female pelvic medicine and reconstructive surgery at the Mayo Clinic in Scottsdale, Ariz., ably described the benefits and technique of robotic-assisted hysterectomy. In this second installment on robotic-assisted surgery, I have asked Dr. Arnold P. Advincula, clinical associate professor of ob.gyn. at the University of Michigan, Ann Arbor, to discuss robotic-assisted laparoscopic myomectomy.

Other than laparoscopic tubal anastomosis, there is no procedure in minimally invasive gynecologic surgery that is more dependent on the ability to be facile with laparoscopic suturing techniques and robotic myomectomy. Certainly, the physician’s need to visualize the repair on a television screen while using limited wrist motion for suture placement limits the vast majority of gynecologists from routinely and effectively performing this procedure.

Dr. Advincula holds several departmental positions at the University of Michigan. He is the director of the minimally invasive surgery and chronic pelvic pain program, the director of the minimally invasive surgery fellowship, and the codirector of the university’s endometriosis center. Dr. Advincula is also a member of the board of trustees of the AAGL and is associate editor of the journal The Female Patient, coeditor of the Journal of Robotic Surgery, and a member of the editorial board of the International Journal of Gynecology & Obstetrics.

Robotic-Assisted Laparoscopic Myomectomy

Hysterectomy has been a natural and successful application for robotics in gynecologic and reproductive care, but it is also now clear that robot-assisted laparoscopic myomectomy takes full advantage—even more so—of what robotic technology brings to the table.

Conventional laparoscopic myomectomy has been so challenging that relatively few gynecologic surgeons have been willing and/or able to move away from the traditional open approach for treating symptomatic leiomyomata. Laparomyectomy thus has remained the standard for myomectomy, leaving many women with a limited number of minimally invasive options if they want to preserve their uterus or fertility, and leaving our health care system shouldering millions of dollars in costs associated with invasive approaches.

It is interesting to note that the total direct cost of treating uterine fibroids in 2000 was estimated at $2.1 billion. Most of the cost, the authors wrote, resulted from inpatient care, particularly hysterectomy (Am. J. Obstet. Gynec. 2006;195:955-64).

The fibroid can then be enucleated while the bedside assistant provides additional traction/coutertraction with a conventional laparoscopic tenaculum or corkscrew.

An alternative is to use the fourth robotic arm with an EndoWrist tenaculum. Care must be taken to avoid excessive traction during the enucleation phase in order to maintain hemostasis and to not prematurely avulse the fibroid. Patience is key.

The removed fibroid is placed in the posterior cul-de-sac—or in one of the parametrical spaces if it is larger—for retrieval at the end of the surgery. When we remove multiple and smaller fibroids, it is important to maintain a myoma count. Tagging each of them with long suture can be helpful for retrieval at the end of the case.

At this point, we usually exchange our instruments for a large needle driver on the left arm and a mega needle driver with a high-force grip and integrated cutting mechanism on the right arm. We typically incorporate a multilayer closure for the myometrium, using either interrupted sutures of 0 Vicryl on CT-2 needles cut to 6 inches, or running sutures of 0 Vicryl on CT-2 needles cut to 11 inches.

With the increased articulation and dexterity of our instruments, our ability to repair a defect is on par with our ability to perform laparotomy. While the surgeon may have the ability to see the incision or the location it would be in conventional laparoscopy.

To close the uterine serosa, we use a running baseball stitch with the end of an SH needle. If multiple fibroids must be removed, we prefer to repair each uterine

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CINCINNATI — Surgical site infections found in deep wounds or in organs or spaces manipulated during an operation of the elbows of vasopressin at each site. We try to remove as many fibroids as possible through a given hysterectomy.

All operative sites are irrigated, hemo-stasis is ensured under low-pressure set-tlings, and an adhesion barrier is placed over all uterine incisions. We typically apply a slurry of finely chopped Seprafilm as an adhesion barrier (an off label use).

With robotic myomectomy, as with any of the robotically as-sisted gynecologic procedures, the importance of the bedside assistant cannot be overestimat-ed. In addition to providing traction/countertraction (we usually don’t need to use a fourth robot-ic arm because our assistants are skilled), the assistant introduces and removes suture, provides irrigation, and manages ureteric or accessory port activity (J Robotic Surg. 2007;1:69-74).

The Patients, the Outcomes

With robotics, there really are not many patients we cannot address. There are no absolute inclusion criteria, and no ab-solute cutoffs. It’s all relative. We deter-mine whether a patient is a candidate for a robotic myomectomy based on the size and mobility of her uterus as well as the size, number, and location of her fibroids.

For example, a patient whose height is 4 feet 10 inches and who is obese with a short truncated torso, a uterus that is not very mobile, and an 8-cm fibroid located over the broad ligament may be a poorer candidate than would a taller patient of average weight with an 8-cm intramural fibroid in a uterus that is extremely mobile. This is where the art of medicine comes into play.

Overall, however, the robotic approach overcomes challenges like obesity, and puts us at a greater advantage as surgeons—giv-ing an ability to suture more effectively and to approach complex pathology much more aggressively—than does conven-tional laparoscopy.

It takes some time to get used to the dra-matic paradigm shift of operating remotely from the patient through a robotic inter-face. Learning to overcome the lack of tac-tile feedback is also part of the learning curve. The key is to not attempt more than you can handle early in the learning process. Then, as your experience grows, your ability to tackle complex gynecolog-ic pathology will come. In other words, start with a symptomatic 4- to 5-cm fun-dal subserosal fibroid before approaching the 10-cm broad ligament fibroid.

We started doing robotic myomec-tomies in 2001. In our first published se ries of 35 cases, the mean myoma weight was 223.2 g. The mean number of my-oamas removed was 1.6, and the mean di-ameter was 7.9 cm. The average estimat-ed blood loss was 169 mL and no blood transfusions were necessary. Three of the cases were converted to laparotomy, two because of the absence of tactile feedback and a third because of cardiogenic shock secondary to vasopressin (J Am. Assoc. Gynecol. Laparosc. 2004;11:511-8).

Since that early experience, we have not had to convert a patient to a laparotomy secondary to an absence of tactile feedback. When we later compared surgical out-comes with those of traditional laparotomy through a retrospective case-matched analysis of 58 patients, we found that although operative times were significantly longer in the robotic group (a mean of 231 minutes vs. a mean of 154 minutes), post-operative complication rates were higher in the laparotomy group.

In all, there were 14 postoperative com-plications in 12 patients in the laparotomy group, including wound dehiscence; hematoma; blood loss and anemia requir-ing transfusion; and deep vein thrombosis followed by respiratory arrest and renal failure. In the robotic group, there were three postoperative complications: aspira-tion pneumonia, port-site cellulitis, and chest pain.

Low Albumin, Reoperation Found to Raise Risk of Surgical Site Infections

Estimated blood loss was significantly higher in the laparotomy group than in the robotic group (a mean of 365 mL vs. 196 mL), and transfusions were required in two patients who underwent laparotom-ty. Length of stay was also higher: 3.6 days in the laparotomy group, compared with 1.5 days in the robotic group (J Min. Invasive Gynecol. 2007;14:698-705).

We have also analyzed the effects of our experience over time and have presented these data at the AAGL annual meeting in November 2007. We found a notable trend toward both lower blood loss and shorter operative time with experience. Addition-ally, we evolved from an average length of stay of 1.5 days to a completely outpatient procedure. We even noted an increasing ability to tackle more complex fibroid cas-es over time, particularly those involving submucosal and deep intramural fibroids.

More recently, we have begun long term follow-up of our patients. Preliminary pregnancy data show us that women who have undergone a robot-assisted laparo-scopic myomectomy in the past 5 years have indeed become pregnant and have carried their pregnancies through with no complications and no uterine ruptures.

Dr. ADVINCUA is a consultant for Intuitive Surgical Inc., Gyrus ACMIS, and SurgRx Inc.

Robotic Hysterectomy Tied To More Cuff Dehiscence

SAVANNAH, GA. — Vaginal cuff dehiscence is more like-ly to occur following robotic hysterectomy than after other types of total hysterectomy, based on the results of a retro-spective review of almost 2,400 cases.

The vaginal cuff dehiscence rate for robotic hysterecto-my was 2.87%, compared with 0.47%, 0.13%, and 0.99% for total laparoscopic, vaginal, and conventional hysterectom-ies, respectively, Dr. Mohamed N. Akl reported at the an-nual meeting of the Society of Gynecologic Surgeons.

Vaginal cuff dehiscence after total hysterectomy is a rare but potentially dangerous complication. To evaluate dehis-cence rates, the researchers conducted a retrospective review of all vaginal cuff dehiscence cases requiring surgical closure of the cuff following total hysterectomy (robotic, abdomi-nal, vaginal, and conventional laparoscopic) between Jan. 1, 2000, and Aug. 31, 2007.

Of the 2,399 hysterectomies, 15% were performed ro-botically, 9% were total laparoscopic procedures, 64% were vaginal, and 12% were total abdominal.

The relative risk of vaginal cuff dehiscence for robotic hysterec-tomy, compared with vaginal hysterectomy, was 8.8. Dr. Akl, a gynecologist at the Mayo Clinic in Scottsdale, Ariz., said at the meeting, which was jointly sponsored by the American Society for Gynecologic Endoscopy.

Dr. Akl reported that he had no relevant financial rela-tionships to disclose.

—Kerri Wachter