

MASTER CLASS

Gynecologists Strike Back With Laparoscopic Uterine Artery Occlusion



BY CHARLES E. MILLER, M.D.

One only needs to check the Internet to see how aggressively our colleagues in radiology are marketing uterine artery embolization/uterine fibroid embolization.

Although the radiologic approach certainly has merit, the risk of inadvertent embolization to other organs is recognized. Laparoscopic uterine artery occlusion not only removes this concern

but also returns to the practicing gynecologist the treatment of leiomyomas.

Moises Lichtinger, M.D., is a well-known advocate of laparoscopic uterine artery occlusion for the symptomatic uterine fibroid. Not only has he worked to develop a safe and reproducible technique for the laparoscopic approach, but he is researching a transvaginal approach to uterine artery occlusion as well, in cooperation with Vascular Control Systems of San Juan Capistrano, Calif.

Dr. Lichtinger currently chairs the department of ob-

stetrics and gynecology at Holy Cross Hospital in Fort Lauderdale, Fla.

He received his undergraduate and M.D. degrees in Mexico and completed his internship and residency at Jackson Memorial Hospital in Miami. He remained at Jackson Memorial to complete a gynecologic oncology fellowship as well. ■

DR. MILLER, a reproductive endocrinologist in private practice in Arlington Heights, Ill., and Naperville, Ill., is the medical editor of this column.

Laparoscopic UAO: Minimal Risks, Considerable Benefits

There was a time when almost all women with symptomatic leiomyomas were amenable to hysterectomy or myomectomy when medical therapy failed to relieve their pelvic pressure and pain, menorrhagia, and, in many cases, anemia.

Today, that has changed.

An increasing number of women don't want myomectomies or hysterectomies, regardless of whether they are performed abdominally or laparoscopically or—in the case of hysterectomies—vaginally. They go to the Internet and easily click on the names of 1,000 radiologists who promise a non-surgical alternative that will “melt away” their fibroids.

Uterine artery embolization (UAE) involves making an incision in the groin and then threading a catheter through the femoral artery to the uterine artery to deliver thousands of polyvinyl particles into the uterus, as well as into the arteries, veins, and peripheral vessels that supply it. The intention is to cause transient uterine ischemia.

Originally used as a presurgical procedure to reduce blood loss during myomectomy or hysterectomy, UAE was also found to be effective in treating life-threatening bleeding that resulted from myomas. Success in controlling bleeding and improving symptoms led to its use as an alternative to primary surgery for leiomyomas in the late 1990s.

A recent surge in popularity was sparked by Food and Drug Administration approval of Embosphere microparticles for UAE and an aggressive marketing campaign by radiologists performing the procedure.

An Alternative to UAE

Laparoscopic uterine artery occlusion (UAO) offers a minimally invasive surgical option that also causes transient uterine ischemia and subsequent relief of leiomyoma symptoms, utilizing the same principles as UAE but permitting the gynecologic surgeon to inspect the uterine cavity, address other gynecologic issues,

and rule out uterine cancer. Understanding either procedure requires a basic understanding of the principle behind bilateral UAO.

The uterine arteries provide most of the uterine blood supply. When this blood flow is blocked—either by polyvinyl microparticles, as in UAE, or by vascular clips during laparoscopic UAO—blood will then clot within the myometrium.

The myometrium becomes hypoxic and its metabolism undergoes a shift from oxidative pathways to anaerobic glycolysis.

Within hours to days, clots are lysed within the myometrium, and collateral arteries begin to reperfuse the uterus.

Myomas, in contrast, cannot lyse clotted blood and reperfuse. They eventually become infarcted and die.

In a proof-of-hypothesis study conducted by my colleagues and me several years ago, we found that the percentage and rate of decline and the return to baseline of pH (a proxy for hypoxia and lactic acidosis) after bilateral UAO were quite variable.

The myometrium has a complex, redundant blood supply that varies from patient to patient (J. Am. Assoc. Gynecol. Laparosc. 2003;10:553-66).

In the vast majority of women, these secondary, tertiary, and quaternary vascular pathways are insufficient to maintain aerobic metabolism.

In 1%-2% of women, however, one uterine artery is hypoplastic, and a large communicating artery connects the ovarian artery to the uterus. Without occlusion of this artery in these patients, the blood supply to the uterus would be maintained despite bilateral UAO.

In our study reviewing eight cases, the uterine pH change from baseline ranged from 0.4 to 1.7 units over a time period that ranged from 5 minutes to 210 minutes after bilateral UAO.

The time for pH to return to baseline ranged from 20 minutes to 660 minutes (J. Am. Assoc. Gynecol. Laparosc. 2002; 9:191-8).

Other investigators have shown via MRI

that clots form more quickly in myomas (as indicated by uptake of contrast media) than in the myometrium, and myoma tissue remains unperfused at 1 year, even as myometrium demonstrates normal perfusion at 1, 2, 3, 4, and 6 months, and 1 year.

In our first study of laparoscopic UAO for symptomatic leiomyomas, we enrolled eight women whom we had counseled extensively about various alternatives, including gonadotropin-releasing hormones, hysterectomy, myomectomy, and embolization.

Operative Technique

The operative procedure is quite straightforward.

Patients are placed in dorsolithotomy position under general anesthesia. A Foley catheter is placed into the bladder. An examination is performed, followed by hysteroscopy, and—if warranted by findings—endometrial biopsies are performed. A uterine cannula is inserted for uterine manipulation.

Depending on uterine size, a 10-mm port is inserted using open technique in the umbilicus or the left upper abdominal quadrant.

For safety reasons, accessing the peritoneum above the psoas muscle prevents direct trauma to retroperitoneal vessels. Entering retroperitoneum lateral to the posterior broad ligament avoids uterine expansion.

Pneumoperitoneum is established under videolaparoscopic guidance. Two additional ports—one is a 5-mm port; the other is a 5-mm or 12-mm port—are then inserted under visualization bilaterally above the inferior epigastric vessels.

Use uterine countertraction on the ipsilateral side while identifying the round ligament. Incise the posterior broad ligament laterally next to the round ligament over the psoas muscle, using endoscopic scissors.

This will free periadnexal adhesions and release uterine lateral displacement from myomas; it also avoids injury to the femoral vessels.

Grasp the cut edges of peritoneum and pull them laterally. Dissect to below the round ligament and lateral to the uterus.

Identify the lateral umbilical ligaments—vestigial obliterated umbilical arteries that reflect from the anterior peritoneum and become retroperitoneal in this avascular area. Trace the fibrous white element cephalad.

When this ligament is pulled laterally, it is easy to visualize the origin of the uterine artery by following the fibrous, bloodless, obliterated hypogastric artery to the internal iliac artery. This artery is straight for the first 2-3 cm, where it can be seen pulsating; it then becomes tortuous and surrounded by veins as it crosses medially above the ureter. It is an extensible artery that tolerates significant maneuvers.

Apply two successive preloaded 5-mm or 10-mm vascular clips at an area that is devoid of venous plexus, further from the ureter and more lateral to the uterus than during laparoscopic hysterectomy.

We do not dissect the round ligaments, vesicouterine space, or ureters.

Blanching of the uterus can be observed once both arteries are occluded.

Manageable Complications

In our study, there were no perioperative complications, and estimated blood loss was less than 25 dL in all cases. The average operating time was 35 minutes, which we have now reduced to 20 minutes in our current experience of more than 100 cases.

Postoperative pain was managed by nonsteroidal anti-inflammatory drugs in all but one case, a patient who requested parenteral narcotic analgesia in the recovery room. In our more recent experience, the majority of patients require only ibuprofen, with an occasional use of Vicodin or Tylenol #3. The study patients were discharged after 12-20 hours, a period primarily for monitoring purposes related to the protocol; today, our patients go home the same day as their surgery.

Among eight patients in the study, seven reported complete resolution of fibroid-related pain at 3 months. One patient's pain declined from moderate to mild. These results have remained consistent in our larger series.

Continued on following page

Continued from previous page

The five patients who previously reported menorrhagia reported eumenorrhea; no patients became amenorrheic. We have seen two patients in our larger series become menopausal, but both were older than 50 years at the time of surgery. None of the patients we have followed with FSH levels has lost ovarian function.

The average decrease in uterine volume at 3 months was 39.4%.

One of our patients has become pregnant and is currently doing well at 20 weeks' gestation.

Complications have been few. Among our original study patients, one passed round tissue vaginally 3 months postoperatively, but her white blood count was normal and she showed no signs of infection.

Simple endometrial adenomatous hyperplasia was diagnosed on the day of another patient's procedure; repeat office curettage showed benign endometrium 3 months later.

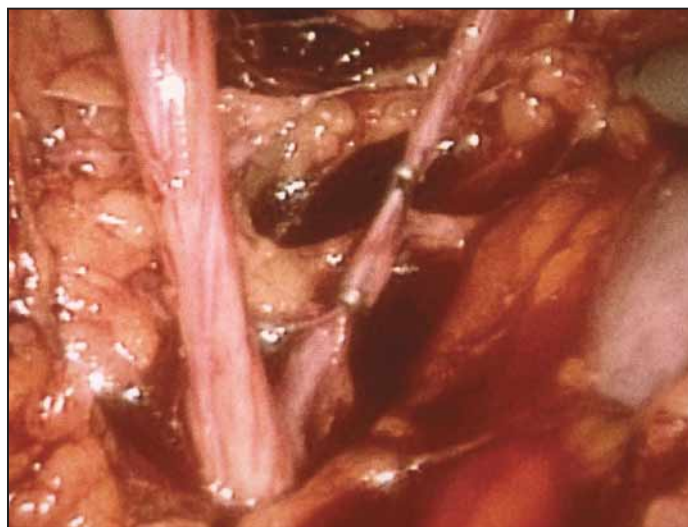
We bill for this procedure using code #37617 (ligation of major artery of the abdomen), after having obtained precertification with insurance companies. We have had no trouble being reimbursed for the procedure.

This procedure carries a very low risk of anesthesia complications, and abdominal entry injuries are possible.

Any procedure involving UAO has potential complications related to uterine ischemia.

Prolapse, vaginal expulsion of necrotic tissue, and pelvic infection are possible. Selecting patients who have adequate perfusion around myomas may decrease the risk of postocclusion infection.

Patient selection is also important with regard to myoma size. Laparoscopic visu-



In this view of the left retroperitoneum, two 5-mm endoscopic clips occlude the proximal portion of the left uterine artery.



This uterus is blanched as a result of hypoperfusion and ischemia after laparoscopic bilateral uterine artery occlusion.

PHOTOS COURTESY DR. MOISES LICHTINGER

alization becomes difficult in patients beyond a 20-week gestation uterine size, and we therefore refer these patients for embolization if they will not consider myomectomy or hysterectomy.

A Comparison of the Two Procedures

As opposed to radiologic embolization, which is a blind procedure, laparoscopic UAO offers an opportunity to diagnose endometrial cancer and sarcomas via fine-needle aspiration and myometrial biopsy.

Additionally, it can be offered as a global treatment for gynecologic complaints other than leiomyomas.

The majority of patients who are candidates for these procedures also have adhesions and/or endometriosis that may be a contributor to their pelvic pain.

In conclusion, we have found that the risks of laparoscopic UAO are minimal, and the benefits to carefully selected patients are considerable.

By contrast, radiologic UAE is a simple

procedure that has been proven efficacious for reducing symptoms. It is not, however, without risks.

Misembolization has been reported to the collateral uterine-ovarian vessel and the legs. Unintended embolization can lead to ovarian failure in 1%-4% of cases.

Pain is a considerable feature of the procedure, both from hypoxia and cramping, as the uterus attempts to expel the polyvinyl pellets. Many patients remain in the hospital for 23 hours on a morphine pump.

Up to 15% of patients experience postembolization syndrome, characterized by fever, anorexia, and nausea/vomiting.

Most importantly, radiologic UAE can be performed in patients with undiagnosed cancer that can evade diagnosis for many months.

There are several reports of embolization in a patient with undiagnosed uterine sarcoma.

Endometrial biopsy and MRI can assist in the presurgical diagnosis of sarcoma;

however, the laparoscopic approach is clearly more thorough in ruling out cancer.

The only real obstacle to widespread use of laparoscopic UAO is the dearth of advanced laparoscopic surgery training among U.S. gynecologic surgeons. This is a retroperitoneal vascular procedure, requiring skillful knowledge of the vascular anatomy.

Future Vaginal Approach?

Because there appears to be a need for a gynecologic alternative to the increasingly popular radiologic UAE, I have recently been working with colleagues and a private company—Vascular Control Systems of San Juan Capistrano, Calif.—to develop a technique to temporarily occlude the uterine arteries with a Doppler-guided, uterine artery clamp using a vaginal approach.

This procedure is still experimental, and we have thus far achieved fibroid shrinkage of approximately 30%. A clinical trial is under way to advance and improve this technique. ■

Apligraf Shows Promise in Building Vaginal Wall in Rokitansky Syndrome

NEW ORLEANS — Apligraf has been used successfully to line a new vagina in a patient with Mayer-Rokitansky-Küster-Hauser syndrome.

The human skin equivalent derived from human infant foreskin has been used widely for wound repair, but this is the first reported successful use for this purpose, Albert Altchek, M.D., reported at the annual meeting of the North American Society for Pediatric and Adolescent Gynecology.

The 19-year-old patient with congenital absence of the uterus and vagina refused the split-thickness skin graft typically used for treating the condition and instead underwent the Apligraf procedure. Perineal biopsy and dissection were used to create a vaginal space, and 20 Apligraf patches—sewn together and wrapped around a soft, inflatable vaginal stent—were applied to the space, said Dr. Altchek of Mount Sinai School of Medicine, New York.

After the patient remained on bed rest for 1 week, the stent was removed and a second Apligraf application was placed. A week later, the Apligraf lining was found to be degenerating as a result of graft rejection; however, a small patch of vaginal mucosal cells that had been present proliferated to

cover the entire neovagina. Soft vaginal stents were used to prevent strictures.

The result was a soft, pliable, moist, normal-looking vaginal mucosal wall, which has maintained patency for 6½ years without a stent, Dr. Altchek said.

Apligraf was previously thought to stimulate only skin growth, but based on this case, it appears that it "actually preferentially stimulates another tissue—mucosa," he said.

In the case of the 19-year-old patient, she had an excellent result. At 6-month follow-up she had normal cytology, and at 4 years she reported frequent sexual activity with orgasm. At last contact she was being referred for a surrogate gestational carrier.

This new method for correcting the defects associated with Mayer-Rokitansky-Küster-Hauser syndrome is investigational but shows great promise, he said, noting that it has several advantages over the split-thickness skin graft approach. Aside from scarring at the donor site, the split-thickness graft approach—unlike the Apligraf approach—results in atypical appearance and function; it also tends to cause malodor because the vagina is created using skin.

—Sharon Worcester

We Have a World of Information Waiting for You

Free online access

cardiologynews.com

clinicalneurologynews.com

clinicalpsychiatrynews.com

familypracticenews.com

internalmedicineneeds.com

obgynnews.com

pediatricnews.com

rheumatologynews.com

skinandallergynews.com

