

Uterine artery embolization for symptomatic fibroids: Pros and cons

This procedure—less invasive than hysterectomy or myomectomy—is becoming increasingly popular among patients. Here, a look at the state of the art.

With the increasing demand for non-surgical alternatives to hysterectomy or myomectomy for fibroids, uterine artery embolization (UAE) has grown in use and popularity—and most patients report a high level of satisfaction after the procedure.

UAE has been shown to be safe and effective in selected patients with symptomatic fibroids unresponsive to medical treatment. If they are not contemplating pregnancy and do not have additional pelvic pathology, these women may elect UAE as an appropriate alternative to hysterectomy or myomectomy. This article reviews the indications, contraindications, technique, complications, and outcomes of UAE.

Limits of primary surgeries increase demand for UAE

Most of the 590,000 hysterectomies performed each year in the United States are for symptomatic fibroids, the most common tumors of the female reproductive tract.¹ Although hysterectomy is the definitive treatment, increasing numbers of patients express a desire for alternatives, primarily to preserve the uterus. While myomectomy spares the uterus, as many as 25% of women who undergo this pro-

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cedure require another surgery for recurrent symptoms.² These limitations of the primary surgeries for fibroids have increased the demand for UAE.

Embolization of the uterine arteries has been utilized for more than 20 years to treat pelvic hemorrhage following delivery or abortion, ectopic or cervical pregnancy, gestational trophoblastic disease, or malignancy.^{3,4} It was first reported as an effective intervention for fibroids in 1995, when Ravina et al⁵ noted that several women with symptomatic leiomyomata who underwent UAE as a pre-hysterectomy treatment had such significant clinical improve-

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KEY POINTS

- Uterine artery embolization (UAE) may be especially useful in women who are poor surgical candidates or have extensive adhesive disease, or who refuse blood products or are perimenopausal.
- The average reported symptom improvement is 87%; the mean reduction in fibroid volume is 46%.
- Most patients are discharged within 24 hours of the procedure and experience an average recovery period of 8 days.
- Women undergoing UAE for fibroids are more likely than those undergoing myomectomy to need further invasive treatment within 3 to 5 years.
- Although several series and case reports have noted successful pregnancies following UAE, desire for fertility is considered a relative contraindication by some authorities.

A turf war

The economic considerations surrounding uterine artery embolization (UAE) have led to a turf war of sorts between gynecologists and interventional radiologists. In Philadelphia, Pa, the average reimbursement to an interventional radiologist for a UAE is approximately \$1,650; for a gynecologist performing a hysterectomy or myomectomy, it is approximately \$1,000.

Some Ob/Gyns are reluctant to recommend UAE for their patients for a variety of reasons. Because of this reluctance, UAE is increasingly marketed directly to the consumer over the Internet and in print media. Large proportions of

women undergoing UAE are self-referrals or are referred by their gynecologist after specifically requesting the procedure.

UAE may represent a societal savings in terms of direct and indirect costs. For example, a Canadian cost analysis found that UAE was associated with significantly lower hospital costs (\$1007.44 Canadian) than abdominal myomectomy (\$1,781.73 Canadian).¹

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ment that hysterectomy was no longer required.

In a study involving 200 patients undergoing UAE for leiomyomata, Spies et al⁶ noted improvement in heavy bleeding in 90% (95% confidence interval [CI], 86%, 95%)

Because data are limited on the safety of pregnancy following uterine artery embolization, some authorities consider the desire for future fertility a relative contraindication.

and a reduction in bulk-related symptoms in 91% (95% CI, 86%, 95%) at 1 year.

On a global level, more than 30,000 UAE procedures have been performed for symptomatic uterine fibroids.

Technique

UAE is a radiologic procedure performed with either local or regional anesthesia. Most commonly, an approach through the right femoral artery is used, after a preliminary arteriogram (FIGURE 1) has been made to

visualize the pelvic vasculature.

Fluoroscopic guidance enables a catheter to be passed into the right femoral artery and through the right external iliac artery to the aorta, then down the left common iliac artery to the left internal iliac, down the anterior division, and finally to the left uterine artery. When the catheter is properly positioned, polyvinyl alcohol particles or acrylic copolymer beads (300 microns to 700 microns) are infused until slow flow or stasis occurs in the uterine artery and the fibroid vasculature is occluded (FIGURE 2). The catheter is then pulled back and manipulated into the right uterine artery, which is similarly embolized. Procedure time ranges from 15 to 120 minutes, depending on the patient's anatomy and the skill of the operator.^{1,6,7}

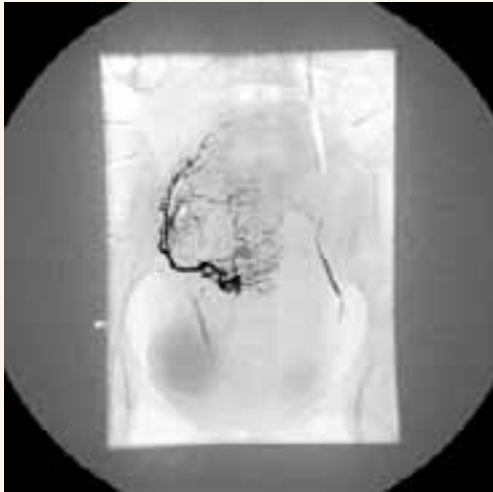
Indications

Like hysterectomy and myomectomy, the indications for UAE are symptomatic fibroids that are unresponsive to medical management (with hormonal agents or analgesics). Common symptoms of fibroids include abdominal or pelvic pain, abnormal menstrual bleeding, anemia, urinary frequency, dyspareunia, and infertility.

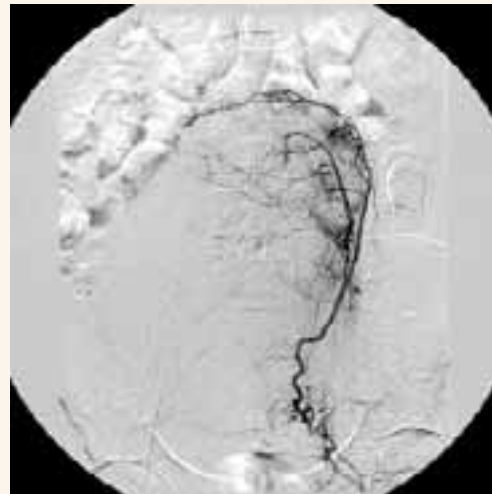
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FIGURE 1

Pre-uterine-artery-embolization arteriograms



Preprocedure right and left arteriograms for vasculature of a 12-week size fibroid uterus.



Preprocedure right and left arteriograms for vasculature of a 24-week size fibroid uterus.

Arteriograms courtesy of Joseph Bonn, MD, Interventional Radiology, Thomas Jefferson University Hospital, Philadelphia, Pa.

FIGURE 2

Embolization catheter infusing microparticles within uterine artery



A catheter is passed into the right femoral artery, through the right external iliac artery to the aorta, then down the left common iliac artery to the left internal iliac, down the anterior division to the left uterine artery. Embolization material—polyvinyl alcohol particles or acrylic copolymer beads—is then delivered via catheter in the uterine artery until slow flow or stasis occurs in the artery.

UAE may be an especially useful option for women who are poor surgical candidates or have extensive adhesive disease, as well as for those who refuse blood products or are perimenopausal.^{6,8,9}

Contraindications

Pelvic infection, severe contrast allergy, arteriovenous shunting, the presence of an undiagnosed pelvic mass, coagulopathy, renal insufficiency, a history of pelvic radiation, and genital tract malignancy all are contraindications.

Because data are limited on the safety of pregnancy following UAE, some authorities consider the desire for future fertility a relative contraindication.^{4,7,10}

Preoperative evaluation

The preoperative workup should include a thorough history and physical examination by both an interventional radiologist and a gynecologist, a pregnancy test, pelvic imaging via ultrasound or magnetic resonance imaging, and endometrial biopsy to exclude endometrial hyperplasia or cancer. (Patients without abnormal bleeding may not require an endometrial biopsy.)

Outcomes

The average reported symptom improvement is 87%, and the mean reduction in fibroid volume is 46%.¹ Most patients see improvement within 3 months of the procedure, with control over the symptoms lasting at least 2 years. At 1 year, 90% of patients report improvement in heavy menstrual bleeding.⁴

Most patients are discharged within 24 hours of the procedure, compared with 48 to 72 hours for abdominal hysterectomy or myomectomy. They also experience an average recovery period of 8 days, compared with 4 to 6 weeks for abdominal hysterectomy or myomectomy.⁶

However, a recent study found that

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TABLE

Rates of pregnancy complications after UAE and in the general population

PREGNANCY	COMPLICATIONS OF PREGNANCY % (NUMBER AFFECTED/NUMBER OF SUBJECTS STUDIED)					
	SPONTANEOUS ABORTION	POSTPARTUM HEMORRHAGE	PREMATURE DELIVERY	CESAREAN DELIVERY	SMALL FOR GESTATIONAL AGE	MAL.*
After UAE for leiomyomata	32 (11/34)	9 (2/23)	22 (5/23)	65 (15/23)	9 (2/22)	22 (5/23)
In the general population	10-15	4-6	5-10	22	10	5

UAE=uterine artery embolization

*MAL=malpresentation

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women undergoing embolization for fibroids were more likely than those undergoing myomectomy to need further invasive treatment (i.e., repeat embolization or surgery) within 3 to 5 years (29% versus 3%).¹¹

Complications

Most patients report some degree of “post-embolization syndrome,” which is characterized by low-grade fever, pain, malaise, nausea, and leukocytosis, generally within the

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first 4 days.⁴ This may be caused by the systemic effects of transient fibroid and uterine ischemia. Although the condition is usually self-limiting and observable on an outpatient basis, these patients are often admitted for antibiotic therapy.

In the most recent series published,¹² major complications occurred in 0.5% of embolizations performed for symptomatic fibroids. They include pulmonary embolism, arterial thrombosis, groin hematomas, local

infection, guide-wire perforation of arteries, allergic reaction to contrast medium, endometritis, ischemia of pelvic organs, sepsis, and death. Among more than 30,000 procedures performed to date worldwide, there have been 4 related fatalities. In 2 cases, pulmonary embolism occurred within a few days of the procedure; the 2 other deaths occurred within 2 weeks and were related to septicemia and disseminated intravascular coagulation.

There have been reports of total uterine necrosis, transient and permanent ovarian failure, and external sexual dysfunction. These complications may occur up to 2 years after the procedure.^{1,4,7,10,13-16} Nontarget vascular embolizations of the gluteus muscle, ovaries, labia minora, and bladder wall also have been noted.^{17,18}

When viewed in the context of the large number of procedures performed—and considering the complications associated with myomectomy and hysterectomy—these rare complications show that, overall, UAE is a very safe procedure.

Pregnancy after embolization

Because we lack controlled studies and abundant data, the role of UAE in women contemplating childbearing is unclear. More studies are needed before UAE can be confi-

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dently recommended for these women. Premature ovarian failure is an uncommon but recognized complication of UAE.¹³

Several series and case reports have noted successful pregnancies following UAE.^{19,20} Our recent report²¹ on 50 pregnancies following UAE for leiomyomata noted higher rates of cesarean delivery, preterm delivery, malpresentation, spontaneous abortion, and postpartum hemorrhage than in the general population (TABLE). It is unclear whether the increased rate of premature delivery and malpresentation is due to residual fibroids, changes in myometrial vascularity or elasticity, or other unknown labor-associated processes.

Pregnancy outcomes following myomectomy have been reported in several case series, with rates of premature delivery and other complications similar to those for the general population.^{22,23} Confounding factors (for example, residual fibroids) and the absence of randomized controlled trials, however, make well-founded comparisons of pregnancy outcomes following UAE and myomectomy difficult.

Theoretical concerns about risk of growth

restriction and preeclampsia following UAE have been raised. In our study, we did not observe an increase of small-for-gestational-age infants following embolization.²¹ Uterine rupture during pregnancy after UAE also has been reported.²⁴ ■

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INTERNET RESOURCES

Society of Cardiovascular and Interventional Radiologists
(www.SIRweb.org)

Fibroid Uterine Artery Embolization Registry
(www.fibroidregistry.org)

American College of Obstetricians and Gynecologists
(www.acog.org)