

Interventional Radiology GRAND ROUNDS

Topic: Uterine Fibroid Embolization

Uterine fibroid embolization (UFE), also known as uterine artery embolization, is a safe and effective minimally invasive treatment for the management of symptomatic uterine leiomyomata. The fluoroscopically guided procedure typically is performed under local anesthesia and conscious sedation using unilateral (or in some cases bilateral) femoral access through a tiny puncture in the groin. Both uterine arteries are selectively catheterized and embolized with embolic particles sized for the perifibroid plexi. The procedure results in ischemic infarction of the fibroids and significant or complete relief of symptoms. Over the past 10 years, since Ravina's original UFE series, the procedure has proven to be safe, effective, durable, and much less invasive than the surgical options.

This procedure, performed by interventional radiologists, is a valuable treatment option to hysterectomy or myomectomy for many women suffering with fibroids. The most common presenting symptoms are menorrhagia, pelvic pain and/or pressure, and increased urinary frequency.

Prevalence

Uterine leiomyomas occur in 20–25% of women of childbearing age and are symptomatic in 10–20%. African-American women are at higher risk, and as many as 50% have fibroids. Leiomyomas are not only more common in African-American women, but the fibroids tend to be larger and more likely symptomatic. Symptomatic fibroids are the leading cause of hysterectomy in the United States, accounting for ~1/3 of the over 600,000 hysterectomies performed in this country each year.

Patients are often discharged the day of the procedure, with the remainder discharged within 24 hours. This has allowed UFE to be performed in the outpatient setting. The majority of patients are able to return to normal activities in 7–10 days.

Patient Preparation

All patients require a thorough history and physical by a gynecologist and pelvic imaging, preferably with MRI (although some centers still use pelvic ultrasound), before undergoing UFE. If patients have an abnormal bleeding pattern, or in some centers if the patient is over 40 years of age, endometrial sampling is obtained.

Patient Satisfaction

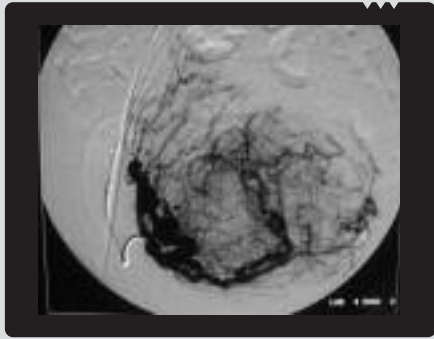
In follow-up surveys, 88–94% of patients indicated that they were “somewhat” or “very” satisfied with the results of UFE. Seventy-nine percent said they would definitely choose the procedure again, and 15% said that they would consider having the procedure again if necessary.

Results

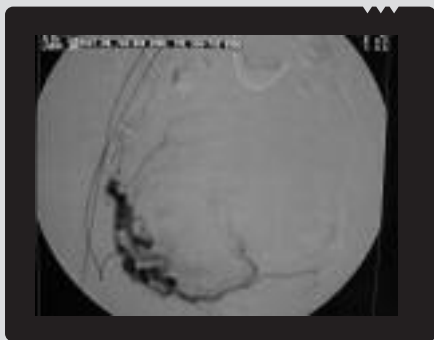
Technical success of UFE for the management of symptomatic leiomyomas ranges from 95–100%, with marked clinical improvement in 85–90% of patients. The procedure is effective for multiple fibroids and large fibroids, with no upper limit in the size or number treated. The mean reduction in uterine volume ranges from 36–69%, with reported follow-up from 2–60 months. However, it is important to remember that the amount of uterine or fibroid reduction does not determine clinical success or the degree of clinical improvement. While it is true that patients with large volume reductions almost universally receive excellent clinical outcomes, patients with minimal or modest volume reductions also can have significant or complete symptom resolution.

Case History

A 42-year-old woman presented with increasingly heavy menses. Her period was 5–7 total days, with 2–3 described as “heavy” days. She reported changing 10–15 pads/day, and could change them as frequently as every hour for several hours at a time. She also noted episodes of blood “flooding” or “gushing” out and passing large clots. She had a Hgb of 8g/dL and was on oral iron. She also reported increased urinary frequency and routine



Uterine artery arteriogram before embolization.



Uterine artery arteriogram after embolization.

(2–3x/night) nocturia. Pelvic pain during menses was 8–9 out of 10. Her past surgical history was significant for myomectomy 2 years earlier. Her past medical history was noncontributory. She was not interested in future fertility. Her Pap was current. A pelvic MRI exam demonstrated multiple leiomyomata; none of which were pedunculated. The endometrium was displaced but otherwise unremarkable. She underwent bilateral uterine artery embolization with a total of 4ml of 500–700 μ m and 4ml of 700–900 μ m trisacryl gelatin microspheres. On her 3-month office visit, she described significant improvement in her menses. She had no more heavy days and no longer passed large clots. Her increased urinary frequency also improved with complete resolution of her nocturia. Her pain also improved during menses from 8–9 out of 10 to 3–4 out of 10. Follow-up pelvic MRI exam showed reductions in uterine and fibroid volumes with no fibroid enhancement. At one year, she reported a light regular period with no heavy days. Her Hgb was normal and she was off iron. Her menstrual pain remained manageable and she had no clinical complaints.

Treatment failures are primarily seen in patients with concurrent adenomyosis or those whose fibroids have remained perfused through ovarian arterial pathways. Some of these latter patients have undergone successful ovarian embolization either in the same or subsequent session.

There are recurrences of treated fibroids after both UFE and myomectomy. But, UFE is a global therapy and myomectomy is only a local therapy and therefore often leaves untreated fibroids behind. Therefore, it is not surprising that there is a significantly higher recurrence rate with myomectomy (10% per year vs up to 3% per year for UFE).

The recurrences seen with UFE come from incompletely infarcted fibroids that regrow and become symptomatic in

time. New fibroids can also develop following either procedure and have been seen as early as 4 years after UFE.

Fertility

Patients have become pregnant and carried normal pregnancies to term following UFE. UFE's effect on fertility appears to be no more than myomectomy in studies to date. The Ontario Trial by Pron reported 24 pregnancies in a group of women who had undergone UFE. While they did not look at the actual fertility rate, the incidence of miscarriage was 17%, which compares favorably with that seen in the general population. There was a slightly higher rate of abnormal placentation, although this may be similar to a post-myomectomy population. Pelage reported a 38% pregnancy rate in patients trying to get pregnant

after UFE (similar numbers to that seen after one myomectomy). Maskova published the first randomized fertility study between UFE and myomectomy with similar numbers, demographics, and fibroid burden. In early results the number of pregnancies and fertility rates were equivalent. While the data on UFE and fertility is not complete, when myomectomy is deemed complex, high-risk, or contraindicated altogether these patients are particularly suited for UFE as the hysterectomy rate for these patients is roughly 3%.

Complications

Patients tolerate UFE well, but moderate to severe pelvic pain and cramping is to be expected following the procedure and a post-procedural pain regimen is a standard part of routine after-care. Significant post-embolization syndrome was seen in up to 15% of cases in the early experience of UFE, although this is now rarely encountered with refinements in the embolization technique, newer spherical embolics, and revised angiographic endpoint. Complications have occurred in less than 5% of cases and are typically mild. Expulsion of fibroid fragments can occur in roughly 5% after UFE and the possibility of this occurrence is explained to all patients. If this material becomes retained in the uterine cavity (which is exceedingly rare), patients will have symptoms of sepsis (pain, fever, and foul-smelling discharge) and prompt involvement of gynecology with cervical dilatation and evacuation is warranted. Extraction is performed on an outpatient basis and invariably resolves the problem. There have been four reported deaths from complications associated with UFE, out of over 40,000 patients treated, for an estimated death rate of ~1 in 10,000. This compares to studies of hysterectomy death rates which are reported between 5–38 in 10,000. Two of the four deaths following UFE were sepsis related and two were due to a pulmonary embolus.

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