Outcomes Following Fibroid Expulsion after Uterine Artery Embolization

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ABSTRACT

Purpose: To evaluate retrospectively the sequelae of fibroid expulsion (FE) after uterine artery embolization (UAE).

Materials and Methods: From a population of 759 UAE procedures performed from July 1999 to June 2009, 37 patients were found to have a uterine fibroid communicating with the endometrial cavity resulting in "bulk" FE with the passage of large fragments or an entire tumor or "sloughing" FE with shedding or "melting" of the tumor. Medical records and magnetic resonance images were evaluated for clinical information and tumor characteristics, respectively.

Results: The mean age of patients with FE was 43 years ± 5 (SD), with 12 nulliparous and 25 parous. Expulsion took place a mean of 14.8 weeks ± 17.7 after UAE (range, 1.6–105.9 wk). FE was asymptomatic in 5% of cases (n = 2) and symptomatic in 95% (n = 35). Among symptomatic cases, 89% (n = 31) had bulk expulsion and 11% (n = 4) had sloughing expulsion. Forty-nine percent of patients (n = 18) had tumor expulsion at home or had an office/emergency room transvaginal myomectomy (TVM), 27% (n = 10) underwent operative TVM, and 8% (n = 3) had hysteroscopic resection. Urgent and elective hysterectomies were performed in 11% (n = 4) and 5% of cases (n = 2), respectively. Nulliparous women showed a trend toward undergoing hysterectomy compared with parous women (33% vs 8%; P = .07, Fisher exact test).

Conclusions: Most women tolerate FE well, with approximately half needing no operative intervention, but some may need to undergo hysteroscopy, operative TVM, or even hysterectomy. Nulliparous women are potentially at greater risk to require hysterectomy.

ABBREVIATIONS

FE = fibroid expulsion, TVM = transvaginal myomectomy, UAE = uterine artery embolization, UFE = uterine fibroid embolization

Uterine artery embolization (UAE) for the treatment of symptomatic fibroids has become a popular therapy for women wishing to retain their uteri since Ravina et al published their results in 1995 (1). The American College of Obstetrics and Gynecology, in a 2008 practice bulletin, with level A evidence, concluded that, based on long- and short-term outcomes, UAE is a safe and effective therapy (2). Several complications have been reported, with one of the most notable being fibroid expulsion (FE). FE may take place weeks to years after embolization (3–11). The fibroid at risk for expulsion are pedunculated submucosal tumors, which are those on a stalk that are completely within the endometrial cavity; submucosal tumors, which are those just underneath the endometrium; and transmural tumors, which are those that extend from the endometrium to the serosa (12). Patients may expel the entire tumor at once or have it fragment over time, with reported symptoms including bleeding, pain, and fever. Other patients may merely

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R.W.T. died October 28, 2009. A trusted colleague and wonderful friend.

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have communication of the tumor with the endometrial cavity, with the tumor dissolving over time, with symptoms of vaginal discharge. Magnetic resonance (MR) imaging is useful in the evaluation and triage of patients after UAE, including those whose fibroids are expelled (13,14). Some patients may require intervention such as transvaginal myomectomy (TVM), hysteroscopy, or even hysterectomy. The present study evaluates the sequelae of FE, including the need for additional procedures and the risk of requiring hysterectomy, to better counsel patients before UAE about the risk of FE.

MATERIALS AND METHODS

The present study was conducted with the approval of our institutional review board and was compliant with the Health Insurance Portability and Accountability Act. This was a retrospective review of patients undergoing UAE, with institutional review board approval to contact patients for their follow-up. Among a population of 759 UAE procedures performed from July 1999 to June 2009, 37 patients were found to meet our definition of FE. Patient information was reviewed from hospital and clinic charts, MR images, and telephone follow-up (n = 35) to determine how the patients tolerated FE. The mean follow-up was 4.1 years, with a range of 0.7–8.9 years.

Patients were evaluated for age, parity, time to FE after UAE, presence or absence of symptoms, uterine and fibroid volumes before and after expulsion, duration of follow-up, types of therapy for FE, and late outcomes. The results of bacterial growth were captured from the FE material from four patients and from blood cultures from another patient for a total of 5 specimens. In those patients whose fibroid was expelled asymptomatically, the time to expulsion was determined by the time to first MR follow-up.

FE was defined as the process after UAE whereby a necrotic fibroid material communicates with, or becomes free within, the endometrial cavity, leading to the material being expelled from the uterus. This process may result in the entire fibroid or portions of it passing though the cervix. FE was subdivided into two types, depending on the patient's reported symptoms and MR imaging characteristics. "Bulk" FE was defined by an entire tumor or large pieces being expelled into the cavity. In this category, the patient or operative results describe large pieces of fibroid material. The other type was defined as "sloughing" FE, whereby the tumor surface "melts" or dissolves over time as it communicates with the endometrium. In this category, the patients described seeing no large pieces of fibroid material but described a chronic discharge.

Inclusion criteria for UAE comprised those patients with symptomatic uterine fibroids who did not desire future pregnancy. Patients were excluded if they had active infection or a pedunculated intracavitary submucosal fibroid larger than 6 cm due to concern for infection. Preprocedural antibiotic therapy was given: cefazolin 1 g IV (GlaxoSmithKline, Research Triangle Park, North Carolina) or levofloxacin 500 mg IV (Ortho-McNeil, Raritan, New Jersey) and clindamycin 600 mg IVSS (Pfizer, New York, New York) in patients with a penicillin allergy. Embolization was performed with 355–500-μm polyvinyl alcohol particles (Contour; Boston Scientific, Natick, Massachusetts; n = 28) or 500–700-μm tris-acryl hydrogel particles (Embosphere; Biosphere, Rockland, Massachusetts; n = 9). Endpoints were stasis and "pruned-tree" appearance for Contour and Embosphere particles, respectively.

Per our standard clinical practice, contrast-enhanced MR imaging was performed within 6 months before UAE and within 3 months after UAE. In addition, patients presenting with symptomatic expulsion underwent imaging studies. Uterine and fibroid dimensions were obtained from the T2-weighted images, measured in the longitudinal, anteroposterior, and transverse dimensions, based on the orientation of the uterus. Volume was calculated according to the standard ellipsoid formula by multiplying length × width × height × 0.52.

Our protocol for the management of FE is shown in **Figure 1**. Patients were instructed to call our clinic with any reports of excessive bleeding, prolonged cramping with or without fever, or vaginal discharge with or without a foul smell that might suggest FE. Patients were initially seen in the interventional radiology clinic or emergency room, and a contrast-enhanced MR imaging study was obtained. MR is helpful in determining whether the tumor is communicating with the endometrial cavity or is within the cavity, the degree of uterine wall attachment and infarction, the presence of fluid or pus, the state of the cervix, and whether tissue is prolapsing through the cervix.

With bulk FE, pain with or without fever usually necessitated an urgent visit. An MR image typically demonstrated avascular portions or the entire tumor within the endometrial cavity, with some degree of detachment from the myometrium. Depending on the level of comfort of the patient's gynecologist, the patient was referred to one of our institution's gynecologists who had managed FE in the past. Generally, a gynecologic examination was performed for cervical tenderness and the presence of cervical dilation and possible purulent discharge. If the cervix was dilated with a prolapsed fibroid, a TVM was attempted in an outpatient setting or in an operating room when general anesthesia was required. Those patients with a closed cervix who were afebrile without a significantly increased white blood cell count were followed closely with pelvic examinations and were given oral analgesic agents. Patient with low-grade fever were given oral antibiotic and analgesic agents. Patients with high-grade fever or significantly increased white blood cell count were admitted and given intravenous antibiotic agents. After defervescence antibiotic therapy was given on an outpatient basis. Oral antibiotic therapy usually included amoxicillin and clavulanate potassium (Augmentin; GlaxoSmithKline) 875 mg every day or ciprofloxacin (Cipro; Bayer, Wayne, New Jersey) 500 mg with metronidazole (Flagyl; Pfizer) 500 mg twice per day. Patients were