

Effect of Direct Marketing for Uterine Artery Embolization on Rates of Leiomyomas, Incidental Findings, and Management After Pelvic MRI

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Abstract

Purpose: The aim of this study was to determine whether a self-referred population screened by an interventional radiology (IR) clinic and a non-IR, physician-referred population differed with regard to suitability for uterine artery embolization (UAE) for symptomatic leiomyomas on the basis of preprocedure MRI.

Methods: This was an institutional review board–approved, HIPAA-compliant retrospective study of 301 women evaluated in an IR clinic for possible UAE from January 2009 to September 2012. Subjects were retrospectively divided into two groups: self-referred via direct marketing (group A, n = 203; mean age, 41.8 years; range, 22–58 years) and physician referred (group B, n = 98; mean age, 42.9 years; range, 30–65 years).

Results: There was no significant difference between groups in presenting symptoms (multiple symptoms, bleeding, bulk-related symptoms, pain). After initial screening, 73.4% of group A (149 of 203) and 79.6% of group B (78 of 98) underwent MRI ($P = .242$). On the basis of MRI findings, 91.3% of group A (136 of 149) and 94.9% of group B (74 of 78) had uterine leiomyomas ($P = .328$). Adenomyosis without leiomyoma was present in 4.0% of group A (6 of 149) and 3.8% of group B (3 of 78) ($P = .947$). Incidental findings requiring further clinical or imaging evaluation were found in 20.8% of group A (31 of 149) and 24.4% of group B (19 of 78) ($P = .539$). After MRI, 41.6% of group A (62 of 149) and 48.7% of group B (38 of 78) proceeded to UAE ($P = .306$).

Conclusions: After initial screening, similar proportions of self-referred and physician-referred patients were candidates for UAE. The rates of confirmed leiomyomas and incidental findings on MRI were similar between groups.

Key Words: Leiomyoma, uterine artery embolization, fibroid embolization, marketing, MRI

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INTRODUCTION

Uterine artery embolization (UAE) was introduced in 1995 as a treatment option for symptomatic leiomyomas [1]. Over the past two decades, arterial embolization has had a marked impact on the treatment of

leiomyomas, and it is now a first-line treatment option for symptomatic leiomyomas [2]. Compared with hysterectomy, UAE is minimally invasive, can be performed with conscious sedation, allows a shorter recovery period, and is thus cost-effective [3–5].

Preprocedure MRI is important for treatment planning and has been shown to alter diagnoses and treatment plans in approximately 20% of women initially thought to have uterine leiomyomas [6]. MRI is used to evaluate leiomyoma burden and can assess the locations, morphology, sizes, and vascularity of uterine leiomyomas. In addition, potential contraindications to UAE are often recognized, including severe adenomyosis, large pedunculated subserosal or submucosal leiomyomas, and vascular anomalies.

Over the past decade, there has been growing interest in expanding the role of interventional radiology (IR) in

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the evaluation and treatment of patients with uterine leiomyomas. Most previous reports have focused on assessing the impact of direct marketing on procedure volumes and generated revenue without comparing this population with a physician-referred population [7-9]. One prior investigation compared a self-referred population with a gynecologist-referred cohort [10]. In this study, the reported percentage of candidates not suitable for UAE was higher and the percentage of patients actually undergoing UAE was lower in the self-referred population, although the statistical significance of this difference was not assessed.

Therefore, in the present study, we hypothesized that self-referred patients undergoing MRI for suspected leiomyomas might have a lower incidence of leiomyomas, a higher incidence of alternative etiologies for their symptoms, and/or a higher incidence of potentially important incidental findings, which may lead to a higher proportion of patients presenting to an IR clinic who are not suitable for UAE than a population referred for UAE by gynecologists or primary care physicians.

METHODS

Our institutional review board approved this HIPAA-compliant retrospective study. A waiver of the requirement to obtain informed consent was obtained.

Patient Population

The IR clinic database was searched for all patients evaluated for possible UAE from January 1, 2009 to July 17, 2012. Using clinic notes and intake questionnaires, subjects seen for UAE were divided into two groups: a self-referred population (group A, $n = 203$; mean age, 41.8 years; range, 22-58 years) and a physician-referred population (group B, $n = 98$; mean age, 42.9 years; range, 30-65 years). During the time frame of our study, our hospital-based IR department engaged in direct marketing of UAE for treatment of symptomatic leiomyomas, including television interviews and radio advertisements, seminars, and fliers. As a result of direct marketing, patients directly contacted the IR clinic without physician referrals. During these telephone calls, patients were screened by nurses for potential contraindications to UAE, including known gynecologic malignancy, current pregnancy or desire to maintain fertility, active pelvic inflammatory disease, severe iodinated contrast allergy, and stages 4 and 5 chronic kidney disease [11]. After this initial screening, patients were scheduled for appointments with interventional radiologists to

discuss different treatment strategies for symptomatic uterine leiomyomas and to help patients determine if they should proceed with UAE. During the same time period, our IR department accepted referrals from gynecologists and primary care physicians who, on the basis of clinical assessment and/or prior imaging, believed that their patients would benefit from UAE.

Chart Review

The clinic charts and hospital electronic medical records were reviewed for presenting symptoms and to see whether patients underwent UAE. In addition, the MRI reports were reviewed for incidental MRI findings and recommendations.

The majority of subjects in both groups presented with multiple symptoms: 77.8% (158 of 203) of group A and 75.5% (74 of 98) of group B, with at least one symptom being bleeding, bulk related, or pain. A single presenting symptom of bleeding (group A, 13.8% [28 of 203]; group B, 14.3% [14 of 98]), pain (group A, 3.4% [7 of 203]; group B, 5.1% [5 of 98]), or bulk-related symptoms (group A, 3.9% [8 of 203]; group B, 2.0% [2 of 98]) was also similar between groups. One subject in group A and two subjects in group B were asymptomatic, and one subject in each group presented with a symptom other than the three major symptoms discussed above.

MRI Technique

Imaging was performed on either a 1.5-T or a 3-T MRI system (GE Healthcare, Milwaukee, Wisconsin; Siemens Medical Solutions, Erlangen, Germany). Imaging was performed with the patient supine, using a phased-array body coil centered over the pelvis. A single-shot turbo/fast spin-echo sequence was obtained in the coronal plane, followed by axial dual gradient-echo T1-weighted (in-phase and opposed-phase) imaging. High-resolution T2-weighted images were obtained in the sagittal and axial planes. Fat-suppressed T2-weighted images were obtained in the axial plane. After the intravenous administration of a gadolinium-based contrast agent, dynamic contrast-enhanced T1-weighted imaging was performed in the coronal plane, and delayed axial and sagittal T1-weighted images were obtained.

Image Analysis

Two radiologists (one with three years postfellowship training and one fourth-year radiology resident) reviewed the MR images of all 227 subjects and measured uterine size in three planes to calculate uterine volume using the

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