SJIF Impact Factor: 6.711

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 9.
Issue: 7
Page N. 381-386
Year: 2025

Original Article www.wjahr.com

EVALUATION OF UTERINE ARTERY EMBOLIZATION THERAPY FOR PAIN MANAGEMENT AND TUMOR SIZE REDUCTION AMONG PATIENTS WITH SYMPTOMATIC UTERINE FIBROID

***[1]Ali Ahmed Darib Albaldawi, [2]Khalid Salih Maulood and [3]Ali Husssein Al-Dharob**

[1]M.B.Ch.B./C.A.B.H.S (Radiology), A.B.I.R.
[2]M.B.Ch.B./ C.A.B.H.S (Radiology), A.B.I.R.
[3]M.B.Ch.B./C.A.B.H.S (Radiology).

Article Received date: 14 May 2025 **Article Revised date:** 03 June 2025 **Article Accepted date:** 24 June 2025

***Corresponding Author: Ali Ahmed Darib Albaldawi**
M.B.Ch.B./C.A.B.H.S (Radiology), A.B.I.R.

ABSTRACT

Background: Uterine fibroids, also known as leiomyomas, are benign smooth muscle tumors of the uterus that affect up to 70% of women by the age of 50. Although many fibroids remain asymptomatic, others can lead to a variety of distressing symptoms such as heavy menstrual bleeding, pelvic pain, pressure symptoms, and infertility. Uterine artery embolization (UAE), has emerged as a minimally invasive and effective alternative to surgical interventions such as hysterectomy or myomectomy, particularly for women seeking uterine preservation. **Objectives:** Is to evaluate uterine artery embolization therapy for pain management and tumor size reduction among patients with symptomatic uterine fibroid. **Methods:** This is a prospective, observational clinical study carried out at a tertiary care center's interventional radiology and gynecology departments over a period of 12 months, from the 1st of January 2022 to the end of December 2022. The study included women aged 25–50 years, and diagnosed with symptomatic uterine fibroids which were suitable candidates for UAE as per gynecological and radiological assessment. Pregnant or current breastfeeding ladies, those with known or suspected uterine malignancy or ladies with active pelvic infection, patients with contraindication to contrast media or NSAIDs, previous UAE or recent hormonal therapy within 3 months, were excluded from the study. The questionnaire included four sections. Section one for sociodemographic information of the study participants. Section two for patients' clinical manifestations. Section three for pain outcomes and section four for size and diameter of the fibroids. **Results:** Sixty patients included in this study and met the inclusion criteria. The mean age of them was 46.6 ± 5.1 years. Moreover; all of the patients were presented with menorrhagia, with leaser extend for dysmenorrhea, pain, bulky symptoms and obstructive symptoms. On the other hand; the majority of patients had multiple fibroid, fibroid size of 50-80 mm. According to visual analog scale before and after frequent time interval of UAE intervention, it's evident that pain was improved frequently with progressing of time. Both solitary and multiple uterine fibroid shows statically significant difference (P-value= 0.031 and 0.022) regarding their size reduction before and after receiving UAE intervention, with no statistically significant difference between them regarding their percentage of reduction (P-value = 0.493). Additionally; the study found a statistically significant difference regarding diameter reduction between patients with fibroid size of more than 80 mm in comparison to those lesser diameter (P value <0.001). **Conclusion:** The current study establishes UAE as a safe and effective alternative to surgery for the treatment of symptomatic uterine fibroids. The impact of fibroid size on UAE outcomes is still being debated, and the current evidence is inconsistent. This study showed that fibroid size or number had little impact on UAE results. This treatment option really ensures a mean uterine fibroid diameter decrease of around 39% after a 1-year follow-up.

KEYWORDS: Interventional therapy, Leiomyomas, Pain, Size.

1- INTRODUCTION

Uterine fibroids, also known as leiomyomas, are benign smooth muscle tumors of the uterus that affect up to 70% of women by the age of 50.[1] Although many fibroids remain asymptomatic, others can lead to a variety of distressing symptoms such as heavy menstrual bleeding,

pelvic pain, pressure symptoms, and infertility.[2-3] Uterine artery embolization (UAE), also referred to as uterine fibroid embolization (UFE), has emerged as a minimally invasive and effective alternative to surgical interventions such as hysterectomy or myomectomy, particularly for women seeking uterine preservation.[4] UAE works by selectively occluding the uterine arteries, thereby reducing the blood supply to the fibroids, which subsequently shrink and undergo ischemic degeneration.[4-5] One of the key clinical considerations during and after UAE is the management of post-procedural pain, which typically results from ischemia and necrosis of the fibroid tissue.[6] Pain following UAE often begins within hours of the procedure and can peak within the first 24 to 48 hours.[7] The intensity of the pain varies among individuals but is frequently described as moderate to severe, particularly in the first few days post-embolization. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen or ketorolac, are widely used as part of the pain management regimen due to their anti-inflammatory and analgesic properties.[7-9] NSAIDs are effective in controlling the inflammatory response and associated pain, especially when administered preemptively and continued postoperatively. However, in some cases, adjunctive opioid analgesia may be required during the initial acute pain phase.[10-11]

The duration of pain post-UAE typically diminishes substantially within 3 to 5 days. Most patients report significant pain relief within the first week and a near-complete resolution of pain by the end of the second week.[12] Chronic pelvic pain, if present prior to UAE, often improves over the subsequent months due to fibroid shrinkage and the reduction of uterine volume.[13] Overall, UAE provides a well-tolerated and efficient method for symptomatic relief in women with uterine fibroids, with a favorable pain control profile when NSAIDs are appropriately utilized. Understanding the trajectory of pain and its management can help improve patient satisfaction and clinical outcomes.[14]

The purpose of this study was to evaluate uterine artery embolization therapy for pain management and tumor size reduction among patients with symptomatic uterine fibroid.

2-PATIENTS AND METHODS

This is a prospective, observational clinical study conducted to evaluate: Pain experienced by patients before and after undergoing uterine artery embolization (UAE) for symptomatic uterine fibroids. The study will be carried out at a tertiary care center's interventional radiology and gynecology departments over a period of 12 months, from the 1st of January 2022 to the end of December 2022. Ethical approval was obtained from the Institutional Review Board (IRB). The information was kept confidential and all patients provided written informed consent.

The study included women aged 25–50 years, and diagnosed with symptomatic uterine fibroids (confirmed via ultrasound or MRI) which were suitable candidates for UAE as per gynecological and radiological assessment. Pregnant or current breastfeeding ladies, those with known or suspected uterine malignancy or ladies with active pelvic infection, patients with contraindication to contrast media or NSAIDs (e.g., allergy, peptic ulcer disease, renal impairment), previous UAE or recent hormonal therapy within 3 months, were excluded from the study.

Sixty patients were recruited based on power analysis ($\alpha = 0.05$, power = 80%) to detect significant differences in pain levels and fibroid volume. The patients were clinically evaluated by transvaginal ultrasound, and pelvic MRI. Pain scored using the Visual Analog Scale (VAS) ranging from 0 (no pain) to 10 (worst pain imaginable). Moreover; the patients were given pre-procedural NSAID which was either oral ibuprofen 400–600 mg or diclofenac 50–75 mg, 1 hour before UAE. UAE Procedure was performed under conscious sedation by an interventional radiologist. polyvinyl alcohol (PVA) particles or tris-acryl gelatin microspheres was used as Embolization material. Both uterine arteries catheterized and embolized until stasis is achieved. NSAIDs continued at scheduled intervals for 5–7 days post-procedure. Pain scores recorded before intervention and at 10, 2 months, 6 months and one year after intervention. MRI or ultrasound at 3- and 6-months post-UAE to assess fibroid size reduction. Patient- pain was reported and UAE efficacy evaluated by changes in VAS scores and rescue analgesic use.

The primary Outcomes reported were change in pain score from baseline to 1-month post-procedure, reduction in fibroid-related symptoms. While the secondary outcomes were fibroid size reduction.

Descriptive statistics for demographics and baseline characteristics was done by using paired t-test or Wilcoxon signed-rank test for pain score comparisons. ANOVA test was used to evaluate pain trends over time. Statistical significance set at $p < 0.05$.

3. RESULTS

Sixty patients included in this study and met the inclusion criteria. The mean age of them was 46.6 ± 5.1 years. Moreover; all of the patients were presented with menorrhagia, with leaser extend for dysmenorrhea, pain, bulky symptoms and obstructive symptoms. On the other hand; the majority of patients had multiple fibroid, fibroid size of 50-80 mm. As shown in table 3.1.

Table 3.1: Distribution of the study participants according to their presenting clinical features.

Variable	Number=60 (%)
Symptoms:	
- Menorrhagia	60 (100%)
- Dysmenorrhea	44 (73.33%)
- Pain	29 (48.33%)
- Bulky Symptoms	50 (83.33%)
- Obstructive symptoms	9 (15.0%)
Number of uterine fibroids:	
-Mean number, mean ± standard deviation	2.5 ±1.1
- Solitary	25 (41.66%)
- Multiple	35 (58.34%)
Dimension of uterine fibroids:	
Less than 50 mm	10 (16.67%)
50-80 mm	27 (45%)
More than 80 mm	23 (38.33%)

Table 3.2 illustrates pain improvement according to visual analog scale before and after frequent time interval of UAE intervention. It's evident that pain was improved frequently with progressing of time.

Table 3.2: Visual analog scales before and after intervention.

Visual Analog Scale	Before intervention	10 Days after intervention	2 months after intervention	6 months after intervention	1 year after intervention
Median (Interquartile range)	3 (2-3)	2 (1-3)	1 (0-3)	1 (0-3)	1 (0-3)
Mean ± standard deviation	2.65 ± 0.42	1.72 ± 0.51	1.27 ± 0.58	1.18 ± 0.71	0.91 ± 0.74

Table 3.3 shows distribution of the study participants according to FIGO classification. The majority of patients were belonging to FIGO classification class of 2-5.

Table 3.3: FIGO classification of the study participants.

Types of Uterine Fibroids	Class 0	Class 1	Class 2-5	Class 6	Class 7	Class 8
Solitary	1	0	19	5	0	0
Multiple	0	2	21	12	0	0
Total	1	2	40	17	0	0

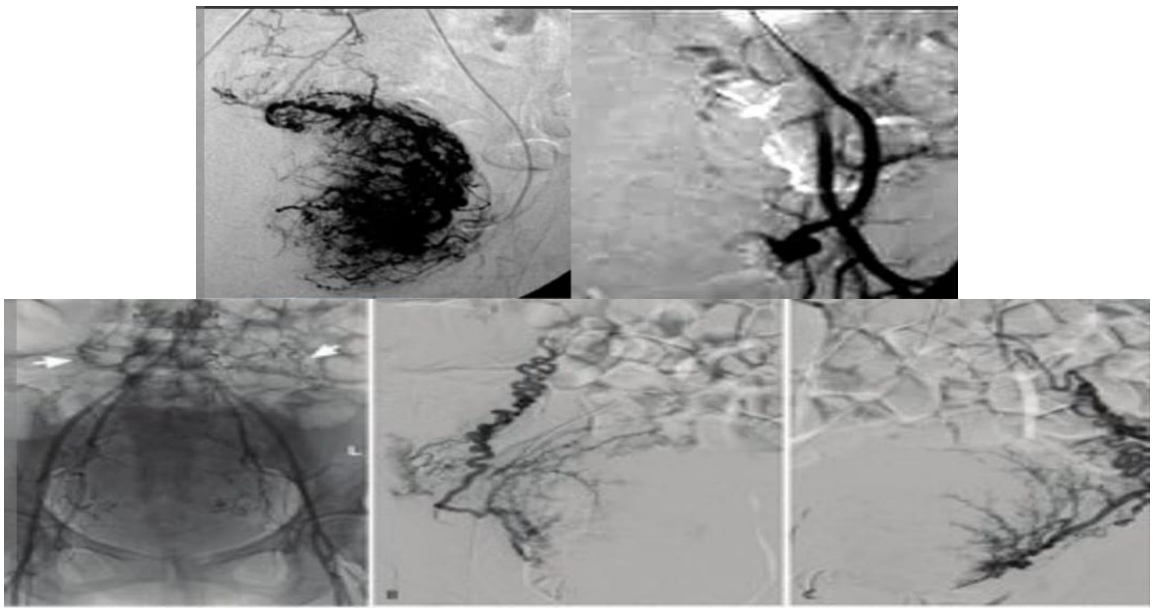

Figure 3.1: Particles in uterine artery emblization.

Table 3.4 compares the size reduction between the patients with single fibroids and those with multiple fibroids before and after 1 year of UAE by number of fibroids. Both solitary and multiple uterine fibroid shows statically significant difference (P-value= 0.031 and 0.022) regarding this issue with no statistically significant difference between solitary and multiple fibroid groups regarding their percentage of reduction (P-value = 0.493).

Table 3.4: Reduction of the size of fibroid following UAE at 1-year follow-up according to the number of fibroids.

Number of uterine fibroid	Pre-UAE Diameter in mm, mean ± standard deviation	P-value	Post-UAE Diameter in mm, mean ± standard deviation	P-value	Percentage of Reduction, percent ± standard deviation	P-value
Solitary	87 .12 ± 26.19	**0.031**	53.39 ± 21.87	**0.022**	38.73 ± 17.35	0.493
Multiple	71.04 ± 28.52		40.27 ± 19.79		39.21 ± 16.29	
Total	77.11 ± 27.77		45.78 ± 20.55		39.04 ± 16.89	

Table 3.5 shows diameter reduction and percentage of reduction according to the size of fibroid after 1 year of UAE intervention. Statistically significant difference regarding diameter reduction between patients with fibroid size of more than 80 mm in comparison to those lesser diameter (P value <0.001).

Table 3.5: Reduction of the size of fibroid following UAE at 1-year follow-up according to the size of fibroid.

Size of uterine fibroid	Diameter Reduction in mm, mean ± standard Deviation	P-value	Percentage of Reduction, percent ± standard deviation	P-value
Less than 50 mm	16.12 ± 7.26	**<0.001**	41.78 ± 16.24	0.891
50-80 mm	27.26 ± 12.87		42.11 ± 15.78	
More than 80 mm	41.27 ± 25.34		41.21 ± 17.12	

4. DISCUSSION

The safety and effectiveness of UAE for treating symptomatic uterine fibroids in patients who are poor surgical candidates or less likely to seek fertility but who wish to postpone surgery are confirmed by this present 1-year follow-up study. Specifically, the process made it possible to reduce fibroid diameter by 39.04%.

First of all, the current study confirms that at least for premenopausal women, age has no impact on the UAE procedure's success, which is consistent with Gudny Jonsdottir et al[15] and Alberta Cappelli et al.[16] However, in another study conducted by Clemens Koesters et al, the age found to have no effect on fibroid volume change.[17] As a result of this disparities in findings, the issue remains unanswered.

The current study shows dramatic pain decrease as the time is progress, which is meant that UAE was shown an effective treatment for symptomatic uterine fibroid. Comparable findings were obtained from Zahra Allameh et al[18] and Jonathan J. Keung et al.[19]

Regarding the location of uterine fibroid, as the majority of the study participants were classified as FIGO 2-5, which are characterized by their submucosal and/or subserosal involvement, meaning they either bulge into the uterine cavity or extend outwards from the uterine wall, potentially impacting both the endometrium and serosa causing infertility. Ashraf Mohamed Naser et al showed comparable result.[20]

While it's commonly observed that single fibroid lesions tend to shrink more significantly after uterine artery embolization (UAE) compared to multiple fibroids.[21] This study has also shown that the number of fibroids doesn't reliably predict the overall uterine volume reduction following UAE. In other words, while patient fibroids might shrink more in cases with fewer fibroids, the total percent of size reduction as a whole can be similar regardless of the number of fibroids present. Eduardo Zlotnik et al had similar findings.[22]

Moreover; the study divided participants into three groups based on fibroid size (less than 50 mm, 50-80 mm, and more than 80 mm) to analyze the size reduction after UAE and potentially select patients with better outcomes. In one study, the mean fibroid volumetric response was considerably larger in the small fibroids than in the big fibroids.[23] UAE may be less effective for substantially enlarged uterine fibroids due to increased collateral circulation. Despite this data, other study reported completely different outcomes, indicating a positive link between baseline fibroid dimension and UAE response, suggesting a little better prognosis for bigger fibroids.[24] Finally, similar to the current study, other authors discovered no relationship between baseline uterine dimension and percentage of reduction in size following UAE.[23, 25] There are a number of reasons why these contradictory findings are hard to explain. First, there were significant differences in the size cut-off and uterine fibroids' size between the studies. Second, uterine fibroids were evaluated using a variety of imaging modalities, including ultrasound and MRI.

Third, selection bias as a result some patient-to-patient variation in treatment response may be occurred. Fourth, several different embolization techniques were used in these studies.

5-CONCLUSION

The current study establishes UAE as a safe and effective alternative to surgery for the treatment of symptomatic uterine fibroids. The impact of fibroid size on UAE outcomes is still being debated, and the current evidence is inconsistent. This study showed that fibroid size or number had little impact on UAE results. This treatment option really ensures a mean uterine fibroid diameter decrease of around 39% after a 1-year follow-up. Based on these findings, it is reasonable to continue providing this treatment to all women with symptomatic fibroids who do not wish to conceive, and the decision to conduct it should not be influenced by the size of the fibroid. The implementation of interdisciplinary collaboration between interventional radiologists and gynecologists should be in line with these findings.

ACKNOWLEDGEMENT

We are grateful for the help provided by the medical team at Ghazi Al hariri Hospital. Without the help of each of these individuals, this study would not have been possible.

Conflict of intertest

About this study, the authors disclose no conflicts of interest.

REFERENCES

1. Ahmad A, Kumar M, Bhoi NR, Akhtar J, Khan MI, Ajmal M, Ahmad M. Diagnosis and management of uterine fibroids: current trends and future strategies. Journal of basic and clinical physiology and pharmacology, 2023 May 1; 34(3): 291-310.
2. Mwikisa D. *Uterine Fibroids: A Silent Crisis* (Master's thesis, University of Nebraska at Omaha).
3. Vannuccini S, Clemenza S, Cassioli E, Rossi E, Castellini G, Ricca V, Petraglia F. Uterine fibroids, perceived stress, and menstrual distress: a key role of heavy menstrual bleeding. Reproductive Sciences, 2023 May; 30(5): 1608-15.
4. Cottrell CM, Stewart EA. Use of Uterine Artery Embolization for the Treatment of Uterine Fibroids: A Comparative Review of Major National Guidelines. Journal of Minimally Invasive Gynecology, 2024 Nov 13.
5. Tsikouras P, Gaitatzi F, Filiou S, Michalopoulos S, Gerede A, Christos T, Zervoudis S, Bothou A, Vatsidou X, Chalkidou A, Dragoutsos G. Uterine Embolization as a New Treatment Option in Adenomyosis Uteri. InEndometriosis-Recent Advances, New Perspectives and Treatments, 2021 Dec 22. IntechOpen.
6. Human GP. The efficacy of intra-arterial lignocaine as an adjuvant analgesic in the management of post-procedural pain following uterineartery embolization for symptomatic uterine fibroids–a comparative study of outcomes.
7. du Pisanie JL, Commander CW, Burke CT. Management of postprocedural uterine artery embolization pain. InSeminars in Interventional Radiology 2021 Dec (Vol. 38, No. 05, pp. 588-594). Thieme Medical Publishers, Inc.
8. Raza MZ, Nadeem AA, Khwaja HF, Omais M, Arshad HM, Maqsood M. Dexamethasone-based Prophylactic Therapy for Prevention of Post-Embolization Syndrome: A Systematic Review and Meta-Analysis Assessing its Efficacy and Influence of Dosage and Timing in Patients Undergoing Arterial Embolization. Annals of Vascular Surgery, 2025 Jan 23.
9. Ribeiro H, Rodrigues I, Napoleão L, Lira L, Marques D, Veríssimo M, Andrade JP, Dourado M. Non-steroidal anti-inflammatory drugs (NSAIDs), pain and aging: Adjusting prescription to patient features. Biomedicine & Pharmacotherapy, 2022 Jun 1; 150: 112958.
10. Doleman B, Leonardi-Bee J, Heinink TP, Boyd-Carson H, Carrick L, Mandalia R, Lund JN, Williams JP. Pre-emptive and preventive NSAIDs for postoperative pain in adults undergoing all types of surgery. Cochrane Database of Systematic Reviews, 2021; 6.
11. Rojals VM, Charaja M, Casasola OD, Montero A, Tamayo MA, Varrassi G, Rojals Sr VM, Tamayo Sr MA. New insights into the pharmacological management of postoperative pain: a narrative review. Cureus, 2022 Mar 10; 14(3).
12. Chan P, Garcia-Reyes K, Cronan J, Newsome J, Bercu Z, Majdalany BS, Resnick N, Gichoya J, Kokabi N. Managing postembolization syndrome–related pain after uterine fibroid embolization. InSeminars in Interventional Radiology 2021 Aug (Vol. 38, No. 03, pp. 382-387). Thieme Medical Publishers, Inc.
13. Ahmad A, Kumar M, Bhoi NR, Akhtar J, Khan MI, Ajmal M, Ahmad M. Diagnosis and management of uterine fibroids: current trends and future strategies. Journal of basic and clinical physiology and pharmacology, 2023 May 1; 34(3): 291-310.
14. Arab H, Al-Turki H, Sendy S, Oraif A, Akkour K, Qari M, Alshangeiti N, Alyousif GF, Alhajri N. Abnormal Uterine Bleeding: Saudi Guideline. Journal of Clinical Gynecology & Obstetrics, 2025 Jan 24; 1-3.
15. Jonsdottir G, Beermann M, Lundgren Cronsioe A, Hasselrot K, Kopp Kallner H. Ultrasound guided microwave ablation compared to uterine artery embolization treatment for uterine fibroids–a randomized controlled trial. International Journal of Hyperthermia, 2022 Dec 31; 39(1): 341-7.
16. Cappelli A, Mosconi C, Cocozza MA, Brandi N, Bartalena L, Modestino F, Galaverni MC, Vara G, Paccapelo A, Pizzoli G, Villa G. Uterine artery embolization for the treatment of symptomatic

uterine fibroids of different sizes: a single center experience. Journal of Personalized Medicine, 2023 May 28; 13(6): 906.
17. Koesters, C.; Powerski, M.J.; Froeling, V.; Kroencke, T.J.; Scheurig-Muenkler, C. Uterine artery embolization in single symptomatic leiomyoma: Do anatomical imaging criteria predict clinical presentation and long-term outcome? *Acta Radiol.* 2014; *55:* 441–449.
18. Allameh Z, Afzali S, Jafarpisheh M, Movahedi M, Mousavi Seresht L. Evaluation of the Efficacy and Complications of Uterine Artery Embolization in Comparison with Laparotomy-Myomectomy in the Treatment of Uterine Myomas: A Randomized Clinical Trial. Med J Islam Repub Iran, 2022 Aug 3; 36: 87.
19. Keung JJ, Spies JB, Caridi TM. Uterine artery embolization: a review of current concepts. Best practice & research Clinical obstetrics & gynaecology, 2018 Jan 1; 46: 66-73.
20. Naser AM, Ahmed RA, Aeboudah WK, Helmy MA. Association between infertility and uterine fibroid: A cross sectional study. The Egyptian Journal of Hospital Medicine, 2023 Apr 1; 91(1): 5353-7.
21. Elsharkawy AM, Elsaeed HH, Kamel AH, Morgan R, Elshafey MH. Comparison between the outcome of single versus multiple uterine fibroids after uterine artery embolization. Egyptian Journal of Radiology and Nuclear Medicine, 2020 Dec; 51: 1-7.
22. Zlotnik, E.; de Lorenzo Messina, M.; Nasser, F.; Affonso, B.B.; Baroni, R.H.; Wolosker, N.; Baracat, E.C. Predictive factors for pelvic magnetic resonance in response to arterial embolization of a uterine leiomyoma. *Clinics*, 2014; *69:* 185–189.
23. Kurban, L.A.S.; Metwally, H.; Abdullah, M.; Kerban, A.; Oulhaj, A.; Alkoteesh, J.A. Uterine Artery Embolization of Uterine Leiomyomas: Predictive MRI Features of Volumetric Response. *AJR Am. J. Roentgenol*, 2021; *216:* 967–974.
24. Katsumori, T.; Yoshikawa, T.; Miura, H. Insufficient Leiomyoma Infarction in Uterine Artery Embolization: Relationship with Tumor Location. *J. Vasc. Interv. Radiol*, 2019; *30:* 668–675.e1.
25. Sipola, P.; Ruuskanen, A.; Yawu, L.; Husso, M.; Vanninen, R.; Hippeläinen, M.; Manninen, H. Preinterventional quantitative magnetic resonance imaging predicts uterus and leiomyoma size reduction after uterine artery embolization. *J. Magn. Reson. Imaging*, 2010; *31:* 617–624.