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Short communication

Uterine artery embolization: Future or past in treatment of symptomatic myomas

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Abbreviations:
UEA – uterine artery embolization
FIGO – Federation Internationale de Gynecologie et d'Obstetrique
MRI – magnetic resonance imaging

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Abstract

Objective: *To evaluate the effectiveness and potential complications of uterine artery embolization (UAE) as a treatment option for symptomatic uterine fibroids in women of reproductive age.*

Methods: *A retrospective analysis was performed on 66 patients who underwent UAE between January 2017 and December 2023 due to symptomatic fibroids or asymptomatic fibroids with documented growth. Embolization was performed using tris-acryl gelatin Embosphere microspheres (500–900 μm). Treatment outcomes were assessed by resolution of clinical symptoms, presence of myoma infarction, and reduction in total myoma volume, as determined by follow-up magnetic resonance imaging (MRI).*

Results: *Complete symptom resolution was achieved in 85% of patients, while myoma infarction was observed in 74.3% of cases. The mean reduction in uterine volume and dominant fibroid volume was 55.95% and 37.51%, respectively.*

Conclusions: *UAE is a minimally invasive radiological procedure that demonstrates high effectiveness in managing symptomatic uterine fibroids. It may represent a valuable alternative to surgical treatment in carefully selected patients.*

INTRODUCTION

Uterine fibroids (leiomyomas) are the most common benign uterine tumors in women of reproductive age, with true epidemiology difficult to establish because many women remain asymptomatic *(1)*. Size, number, and location vary, and multiple fibroids are frequent, reported in up to 84% of myomatous uteri *(2)*. When symptomatic, fibroids most often cause heavy, prolonged, and irregular bleeding, pelvic pain, and pressure symptoms from compression of adjacent organs, all of which impair quality of life *(1, 3–5)*.

Treatment options include medical therapy, surgery, and interventional radiology. Since its introduction in 1995, uterine artery embolization (UAE) has become a minimally invasive alternative to surgery for women wishing to preserve the uterus *(6)*. Technically, UAE exploits the preferential vascularity of myomas: tumor-feeding arterioles are typically ≥500–800 μm, which guides embolic particle sizing *(7)*. Pre-procedural angiography helps visualize myoma blush and identify potential utero-ovarian anastomoses to minimize non-target embolization *(7)*. Patient selection is crucial, with absolute and relative contraindications that include pregnancy, active genital tract infection, suspected malignancy, certain cervical or pedunculated subserosal myomas, very large

uterine size, severe renal failure, coagulopathy, prior pelvic radiotherapy, and adenomyosis, among others *(8–10)*.

Imaging underpins both selection and follow-up. Pelvic MRI offers the highest sensitivity and specificity for fibroid detection and for assessing post-procedural changes *(11)*. The FIGO system standardizes fibroid classification and guides therapy *(12)*. Prior studies report substantial reductions in uterine and fibroid volumes after UAE, along with high rates of symptom control, while also documenting expected postembolization syndrome and low rates of major complications *(13–19)*.

The aim of this study was to present institutional experience and evaluate the effectiveness and safety of UAE for symptomatic fibroids in women of reproductive age.

MATERIALS AND METHODS

A retrospective study included 66 women who underwent UAE for symptomatic fibroids between January 2017 and December 2023 at the Sestre milosrdnice University Hospital Center, Zagreb. The mean age was 42 years (range 23–52). Mean follow-up was 7 months.

UAE was performed via left brachial or radial access to facilitate bilateral pelvic catheterization and early mobilization. Using a 4F catheter or 2.8F microcatheter, the internal iliac and uterine arteries were selectively catheterized. Embosphere® tris-acryl gelatin microspheres (500–900 µm) were mixed with contrast and injected until slow flow/stasis was achieved in both uterine arteries, indicating distal branch occlusion within the myoma *(7)*. Pre-procedural uterine angiography documented myoma opacification and assessed for utero-ovarian anastomoses *(7)*.

All patients underwent pelvic MRI before UAE and at follow-up to quantify uterine and dominant fibroid volumes, assess enhancement (infarction), and exclude imaging features suspicious for malignancy. MRI has reported sensitivity up to 100% and specificity of 91% for fibroid detection and post-UAE changes *(11)*.

Standard premedication (dexamethasone, ketoprofen) and postoperative symptomatic therapy (opioid analgesics, antiemetics, antipyretics) were administered. Antibiotics were not given routinely but only in cases of fever with leukocytosis.

Outcomes

The analysis included (1) clinical symptom resolution; (2) infarction of myomas on MRI; and (3) percentage change in uterine and dominant fibroid volumes. Dominant lesions were categorized using the FIGO classification at baseline *(12)*.

RESULTS

Most patients (81.8%) were 35–50 years old. The median number of fibroids per uterus was multiple (mean ~5; range 1–20), in line with prior reports of multiplicity

Table 1. *Distribution of myoma number and FIGO classification of the dominant myoma in the study sample.*

	FIGO classification of dominant myoma (1-8,X-X)											
Number of myomas	0-1	1	1-5	2	2-5	2-6	3-5	3-6	5	6	8	Total
1	1	2			7	2		4		3	1	20
2				2	3	2				1		8
3		1	1		1		2	1				6
4		1		3					1	1		6
5		1						1				2
6					3			2				5
7				1	2				1			4
8					2	1		1				4
9						1				1		2
10					2							2
11									1			1
12									1			1
15								1		1		2
18					1							1
20					1					1		2
Total	1	5	1	6	22	6	2	10	4	8	1	66

(2). Dominant fibroids were most commonly FIGO type 2–5 hybrid lesions (33.3%), followed by type 3–6 (15%) and type 6 subserosal (12%) *(12)*.

Uterine volume decreased from a mean of 559.3 mL to 335.3 mL (-55.95%), and dominant fibroid volume decreased from 150.7 mL to 92.4 mL (-37.51%). Complete infarction occurred in 74.3% of cases; partial or incomplete infarction in 18.2%. Clinically, 85% of patients reported complete symptom resolution.

Postembolization syndrome (transient pain, low-grade fever, malaise, nausea, anorexia) was frequent but resolved with symptomatic treatment. One major complication occurred: delayed uterine necrosis with abscess within the myoma, requiring hysterectomy two months post-UAE. No other severe adverse events were observed.

DISCUSSION

The study demonstrated substantial reductions in uterine and dominant fibroid volumes and high rates of symptom control after UAE, consistent with published series reporting meaningful volumetric regression and durable clinical improvement *(13–16)*. The complete infarction rate of 74.3% aligns with ranges reported in prior MRI-based outcome studies *(13–16)*.

Safety outcomes were favorable. Postembolization syndrome was common yet self-limited, as described previously *(13–16)*. A single major complication requiring surgery was within the expected spectrum reported in the literature, where overall complication rates vary widely depending on definitions and follow-up (≈5%–40%) *(17-19)*. Careful angiographic assessment of utero-ovarian anastomoses and appropriate particle size selection remain central to minimizing non-target embolization *(7–10)*.

UAE offers shorter recovery and avoids the risks of open surgery, which is particularly relevant for women seeking uterine preservation or with elevated surgical risk *(6, 13)*. The routine use of radial/brachial access supported early mobilization without compromising technical success. MRI proved invaluable for both selection and objective follow-up, consistent with its reported diagnostic performance *(12)*.

The study was single-center, retrospective, with a modest sample size and mid-term follow-up. A comparator arm of surgical or medical therapy was not included, and patient-reported outcomes were limited to symptom resolution rather than validated quality-of-life instruments *(5)*. Future prospective studies with longer follow-up and standardized patient-reported outcomes are warranted.

CONCLUSION

UAE was shown to be safe and effective minimally invasive treatment for symptomatic uterine fibroids, achieving high rates of symptom resolution, substantial volumetric regression, and low rates of major complications. It should be considered a valuable alternative to surgery in appropriately selected women who wish to preserve the uterus.

REFERENCES

1. Orešković S. Dobroćudni tumori maternice-miom 2001 In: Šimunić V. i sur. Ginekologija, Medicinska biblioteka, Zagreb, p 441-5
2. Cramer SF, Patel A. The frequency of uterine leiomyomas 1990 Am J Clin Pathol. 94(4):435-438. https://doi.org/10.1093/ajcp/94.4.435
3. Zimmermann A, Bernuit D, Gerlinger C, Schaefers M, Geppert K. 2012 Prevalence, symptoms and management of uterine fibroids: an international internet-based survey of 21,746 women. BMC Womens Health 12:6. https://doi.org/10.1186/1472-6874-12-6
4. Wallach EE, Vlahos NF. Uterine myomas: an overview of development, clinical features, and management 2004 Obstet Gynecol. 104(2):393-406. https://doi.org/10.1097/01.AOG.0000136079.62513.39
5. Downes E, Sikirica V, Gilabert-Estelles J, Bolge SC, Dodd SL, Maroulis C, Subramanian D. The burden of uterine fibroids in five European countries. Eur J Obstet Gynecol Reprod Biol. 2010 Sep;152(1):96-102. doi: 10.1016/j.ejogrb.2010.05.012. Epub 2010 Jul 3. PMID: 20598796.
6. Ravina JH, Herbreteau D, Ciraru-Vigneron N, et al. 1995 Arterial embolisation to treat uterine myomata. Lancet 346(8976):671-672. https://doi.org/10.1016/s0140-6736(95)92282-2
7. Expert Panel on Interventional Radiology:, Knuttinen MG, Stark G, Hohenwalter EJ et al. 2018 ACR Appropriateness Criteria® Radiologic Management of Uterine Leiomyomas J Am Coll Radiol JACR 15(5S):S160–70. https://doi.org/10.1016/j.jacr.2018.03.010
8. Masciocchi C, Arrigoni F, Ferrari F et al. Uterine fibroid therapy using interventional radiology mini-invasive treatments: current perspective 2017 Med Oncol Northwood Lond Engl. 34(4):52. https://doi.org/10.1007/s12032-017-0906-5
9. Solnik MJ, Munro MG. Indications and alternatives to hysterectomy 2014 Clin Obstet Gynecol. 57(1):14–42. https://doi.org/10.1097/GRF.0000000000000010
10. Cooper S, Oceguera LM, Danes S. Uterine artery embolization: a vascular surgery procedure? One vascular surgery group's experience 2012 Vascular 20(5):268–72. https://doi.org/10.1258/vasc.2011.oa0341
11. Dueholm M, Lundorf E, Hansen ES, Ledertoug S, Olesen F. 2001 Evaluation of the uterine cavity with magnetic resonance imaging, transvaginal sonography, hysterosonographic examination, and diagnostic hysteroscopy. Fertil Steril. 76(2):350-357. https://doi.org/10.1016/s0015-0282(01)01900-8
12. Munro M, Critchley H, Fraser I. The Flexible FIGO Classification Concept for Underlying Causes of Abnormal Uterine Bleeding 2011 Semin Reprod Med. 29(05):391–9. https://doi.org/10.1055/s-0031-1287663
13. Hutchins SL Jr, Worthington-Kirsch RL, Berkowitz RP. Selective uterine artery embolization as primary treatment for symptomatic leiomyomata uteri 1999 J Am Assoc Gynecol Laparosc 6:279-284. https://doi.org/10.1016/s1074-3804(99)80061-9
14. Goodwin SC, McLucas B, Lee M, Chen G, Perrella R, Vedantham S, et al 1999 Uterine artery embolization for the treatment of uterine leiomyomata: mid-term results. J Vasc Interv Radiol 10:1159 1165 https://doi.org/10.1016/s1051-0443(99)70213-7

15. Pelage JP, Le Dref O, Soyer P, et al. 2000 Fibroid-related menorrhagia: treatment with superselective embolization of the uterine arteries and mid-term follow-up Radiology 215:428-431. https://doi.org/10.1148/radiology.215.2.r00ma11428

16. Walker WJ, Green A, Sutton C. 1999 Bilateral uterine artery embolisa tion for myomata: results, complications and failure Min Invas Ther Allied Technol 8:449-454. https://doi.org/10.3109/13645709909152923

17. Spies JB, Rundback JH, Ascher S, et al. 2006 Development of a research agenda for uterine artery embolization: proceedings from a multidisciplinary research consensus panel J Vasc Interv Radiol JVIR. 17(12):1871–9. https://doi.org/10.1097/01.RVI.0000251151.01365.c1

18. Nassiri N, Balica A, Cirillo-Penn NC, et al. 2018 An Academic Tertiary Referral Center's Experience with a Vascular Surgery-Based Uterine Artery Embolization Program. Ann Vasc Surg. 52:90–5. https://doi.org/10.1016/j.avsg.2018.03.008

19. Stewart EA, Lytle BL, Thomas L, et al. 2018 The Comparing Options for Management: PAtient-centered REsults for Uterine Fibroids (COMPARE-UF) registry: rationale and design. Am J Obstet Gynecol. 219(1):95.e1-95.e10. https://doi.org/10.1016/j.ajog.2018.05.004