

Diagnosis, treatment and follow-up of symptomatic uterine fibroids: A complete radiological protocol

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Learning objectives

To review uterine embolization (UE) technique.

To describe our protocol for diagnosis, treatment and follow-up of uterine fibroids.

To review the imaging and clinical changes in Magnetic Resonance Images (MRI) in a series of 21 cases.

Background

Uterine fibroids are the most frequent gynecological tumors that appear in women of reproductive age. They are benign monoclonal tumors that arise from smooth muscle cells of the myometrium. They are usually asymptomatic and diagnosed incidentally. When they are symptomatic they often require treatment that include hormonal, surgical treatment or embolization.

UE is a minimally invasive procedure for treatment of symptomatic uterine fibroids. MRI is the best imaging technique for diagnosis, evaluation and post-treatment radiological follow-up. The number, size and location of fibroids must be reported.

Findings and procedure details

Our purpose is to review the embolization technique as well as the MR images in a series of 21 cases.

Symptomatic uterine fibroids are the main indication for uterine embolization. The most common clinical syndromes are hypermenorrhea, dyspareunia or abdominal pain.

Before the procedure a complete gynecological and imaging evaluation is necessary to rule out contraindications.

Adnexal, endometrial and uterine pathology need to be excluded before the procedure as well as the location of fibroids. Literature recommends avoiding this technique in pedunculated fibroids.

Uterine embolization technique in our hospital steps are: epidural anesthesia, sedation and prophylactic antibiotic treatment of the patient followed by the puncture of the common femoral artery. The uterine arteries are catheterized and embolized using spherical particles. Finally, a control arteriography is performed to demonstrate correct embolization ([Fig. 1](#) on page 6 and [Fig. 2](#) on page 6).

Absolute bed rest for 24-48 hours, adequate blood pressure control and pain control are recommended after the procedure. Morphine is administered through an epidural catheter for 24 hours. The complications can be divided in immediate, acute (first 30 days) or long-term (after 30 days). Immediate complications include allergic reactions to contrast, iatrogenic vascular lesions, thrombosis and infections like septicemia. Acute complications are recurrent pain, haemorrhagia, genital infection or vaginal expulsion of the fibroid. The most common long-term complication is post-embolization amenorrhea. Post-embolization syndrome had been described and characterized by abdominal pain, nausea, vomiting, low-grade fever and leukocytosis. It appears 24-48 hours after the procedure and usually ends within 48 hours. The differential diagnosis with sepsis must be done.

Six months after procedure MRI is performed to assess post-embolization changes.

Before embolization, MRI study of the vascularity of fibroids allows to assess if embolization is the indicated treatment for the patient. More vascularized fibroids are more likely to respond to treatment, while fibroids with cystic-necrotic areas with low vascularity will show a lower response to treatment.

Non-degenerated fibroids have a typical MRI presentation: well-delimited masses with low signal compared to the myometrium in T2-weighted sequences and intense contrast enhancement ([Fig. 3](#) on page 7 and [Fig. 4](#) on page 8).

Cellular fibroids have hypersignal in T2 and enhance after gadolinium administration in T1 sequences. Degenerated fibroids have variable appearance in T1, T2 and after gadolinium administration.

After embolization, uterine fibroids MRI findings are: hypersignal in T1 due to hemorrhagic necrosis, with a variable T2 signal. No contrast enhancement is seen if fibroid is necrosed ([Fig. 5](#) on page 9 and [Fig. 6](#) on page 10).

Absence of contrast enhancement of the fibroid after embolization is indicative of good prognosis. Patients that show residual contrast enhancement will probably require re-embolization or other treatments. Another common finding in MRI after UE include the reduction of uterine fibroid and uterus size.

We have done a retrospective review of a series of 21 patients with uterine fibroids treated by arterial embolization technique during 6 years (2010-2016).

In our series of 21 patients, the average maximum diameter of the uterus and fibroids decreased from 13,7cm and 7,6cm to 10,4cm and 5,6cm respectively. Also the average volume of the uterus and fibroids decreased from 597,86cm³ and 256,63cm³ to 327,65cm³ and 94,55cm³ respectively calculated with the formulas: $\frac{4}{3} \cdot \pi \cdot L / 2 \cdot W / 2 \cdot AP / 2$ for the uterus and $\frac{4}{3} \cdot \pi \cdot r^3$ for fibroids due to their approximate spherical shape ([Table 1](#) on page 6). In patients with several fibroids, the largest fibroid was measured.

16 of 21 patients did not present contrast enhancement in MRI after uterine embolization. 3 patients had minimal contrast enhancement, however they had a correct clinical evolution and did not require re-embolization or other treatments. 2 patients had persistence of contrast enhancement and clinical symptoms didn't improve, so a hysterectomy was performed in both of them. 19 of 21 patients did not required other treatments, with effectivity of 90% in our series.

Images for this section:

	Uterus		Fibroid	
	Pre treatment	Post treatment	Pre treatment	Post treatment
Diameter	13,7	10,4	7,6	5,6
Volume	597,86	327,65	256,63	94,55

Table 1: Average maximum diameter in cm and volume in cm³ of the uterus and fibroids before and after uterine arteries embolization.

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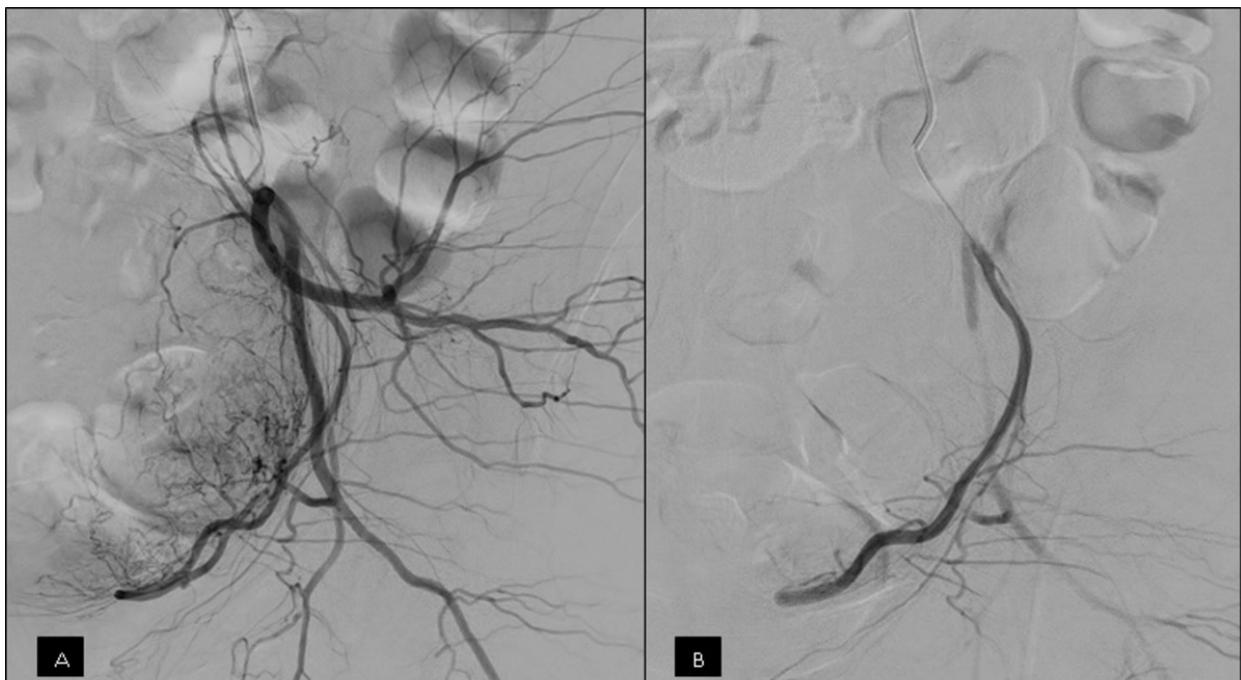


Fig. 1: 45-year-old woman with menorrhagia and secondary anemia. Image of subtraction arteriography. A) Left hypogastric artery catheterization showing the fibroid vascularization. B) Control after the procedure showing correct embolization.

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Fig. 2: Subtraction arteriography of the same patient shows the vascularized fibroid from the right hypogastric artery (A) and the arteriographic control after the embolization (B)

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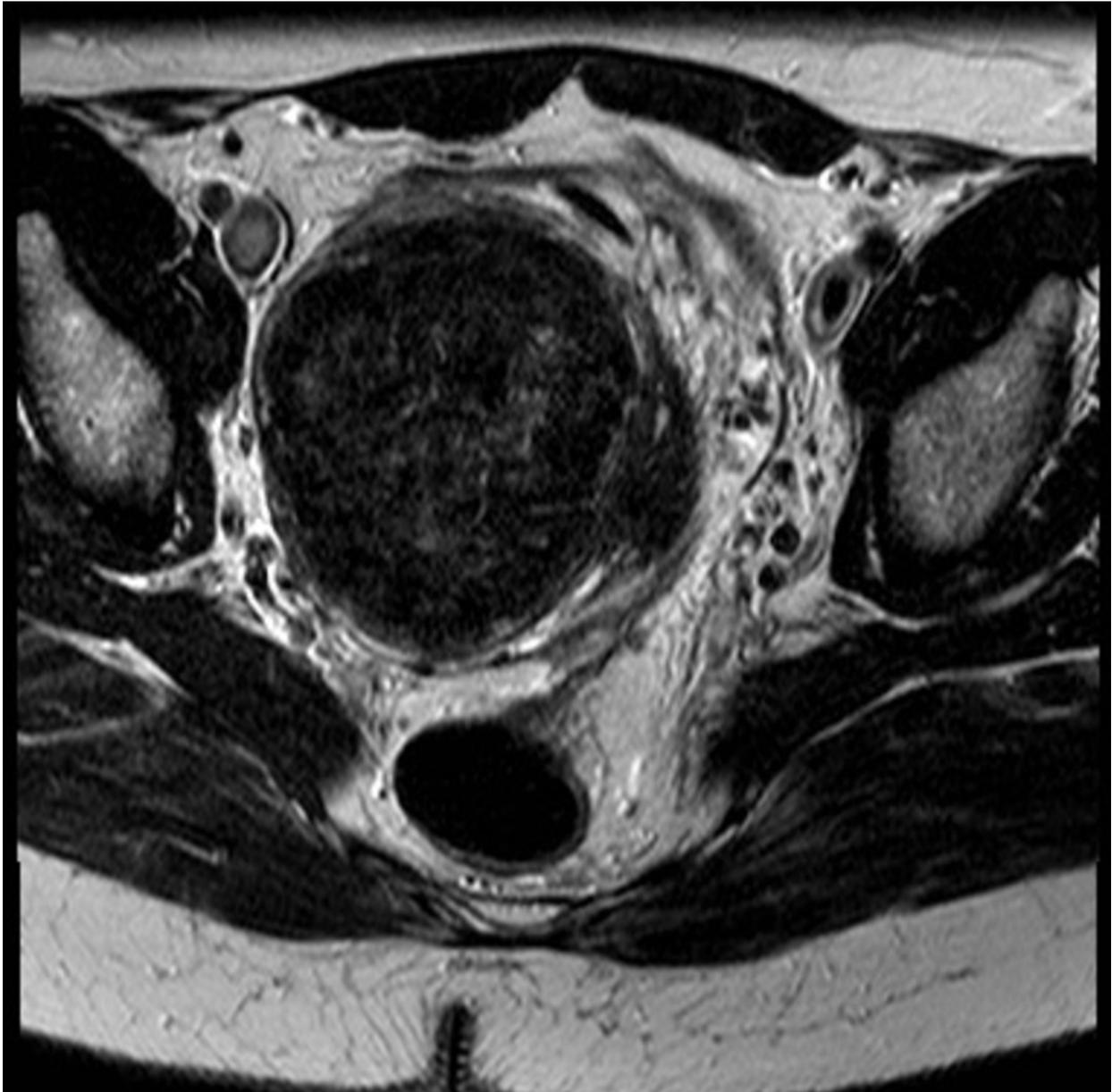


Fig. 3: 45-year-old woman with metrorrhagia. Axial image of T2-weighted MRI showing an uterine fibroid with low signal in this sequence.

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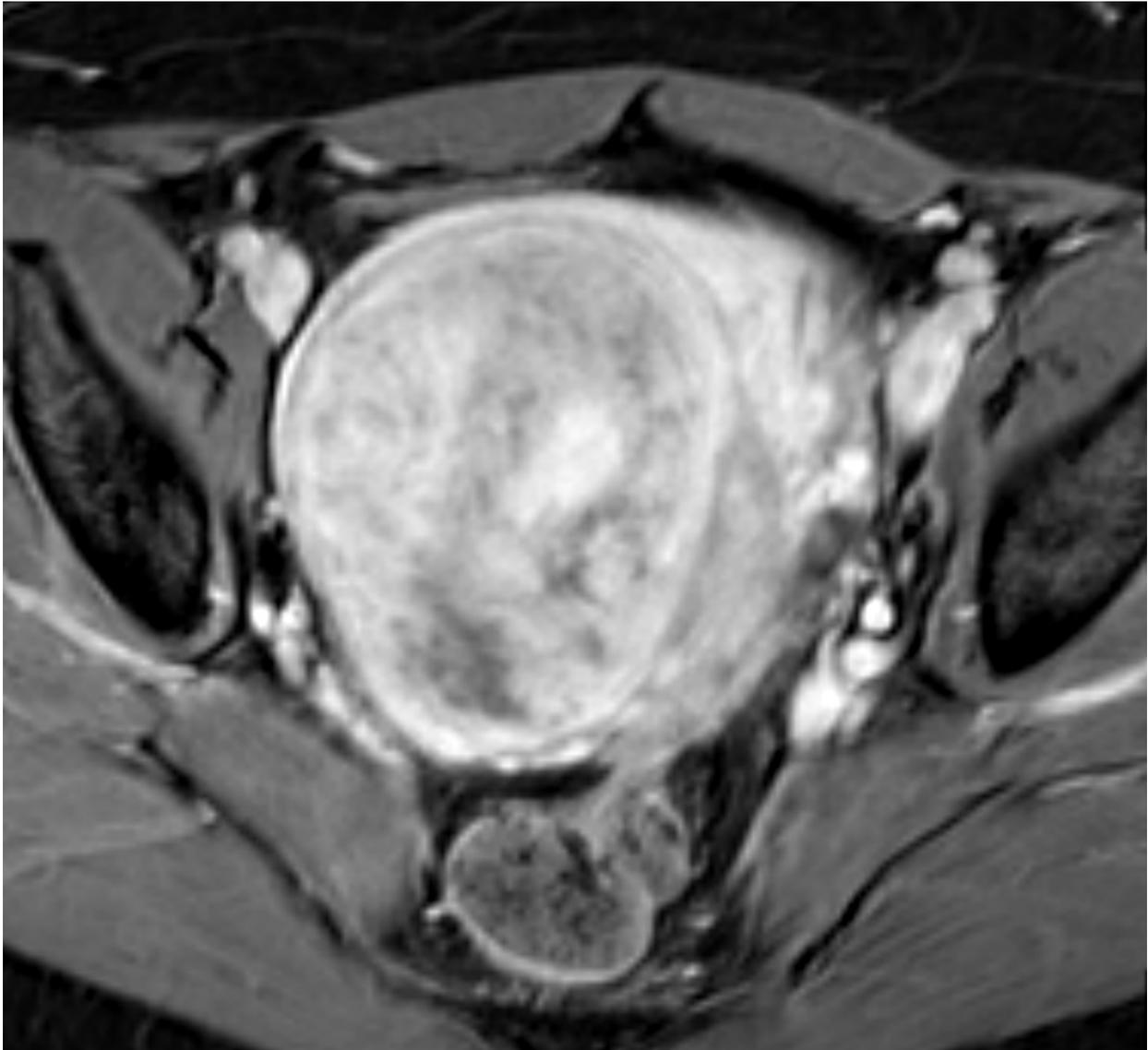


Fig. 4: Axial T1-weighted fat suppression after contrast administration in same patient. Uterine fibroid has intense contrast-enhancement.

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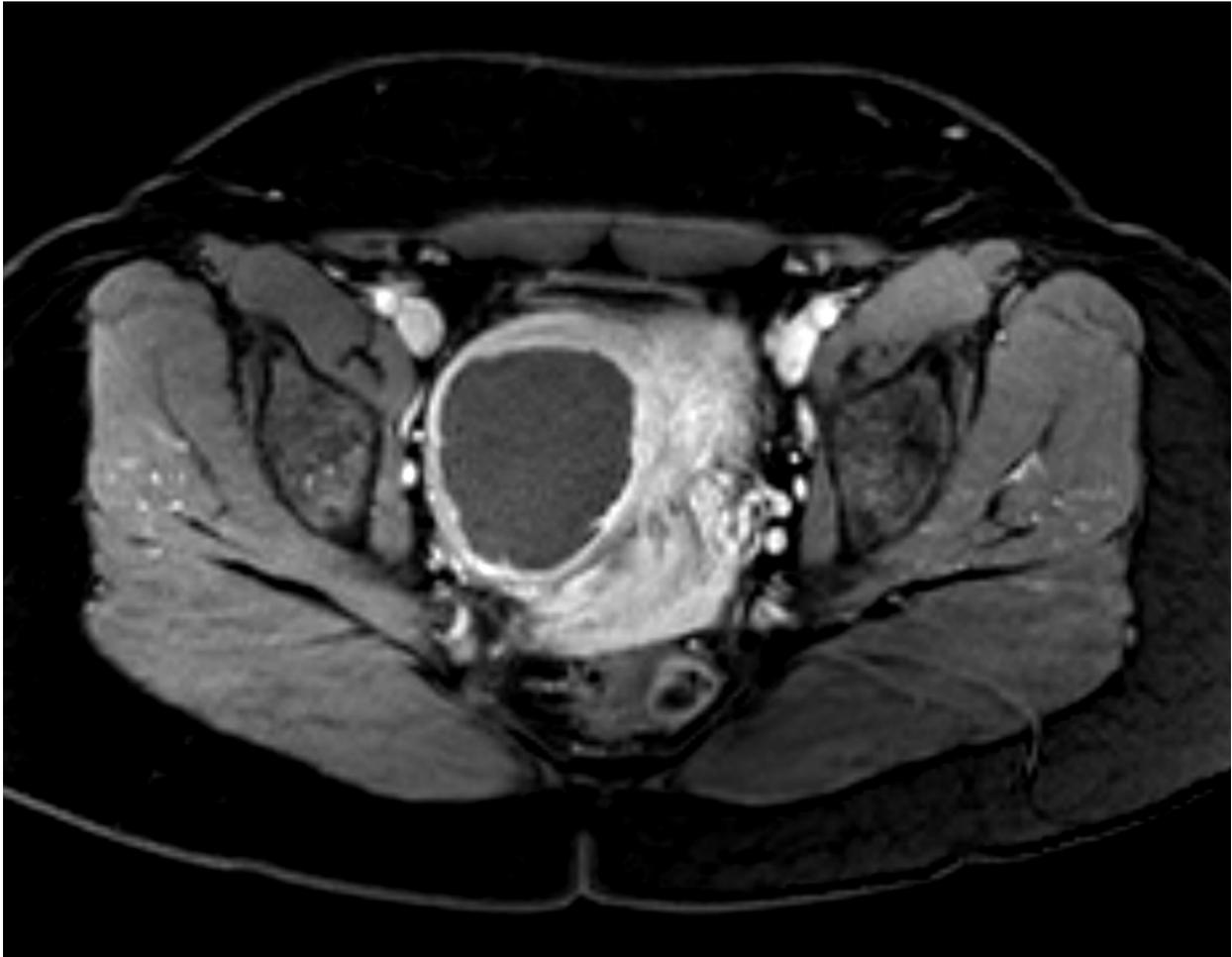


Fig. 5: T1-weighted fat suppression with contrast administration in same patient after uterine arteries embolization reveals nonenhancing fibroid due to uterine fibroid infarction.

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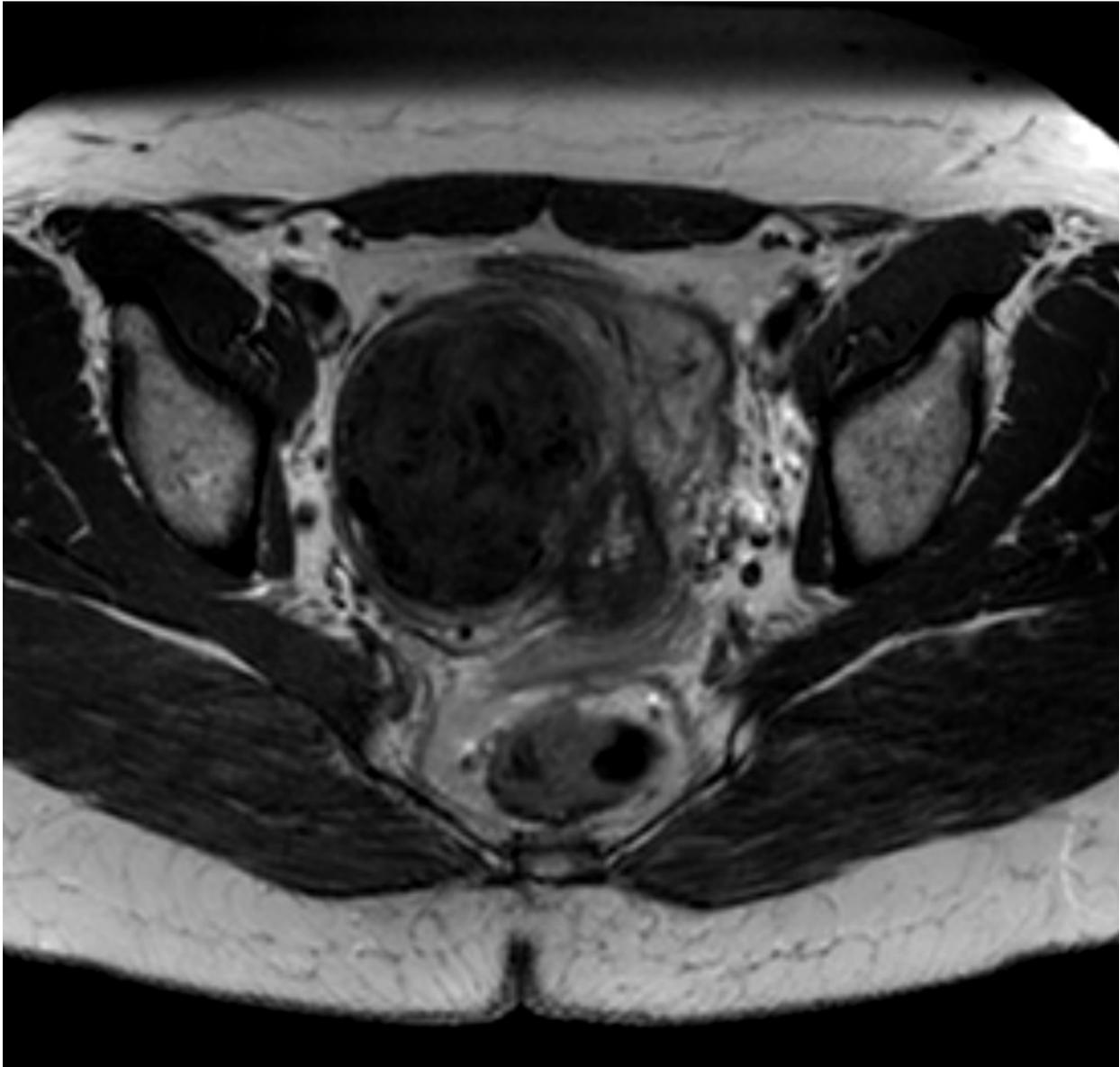


Fig. 6: Axial T2-weighted in same patient after uterine arteries embolization showing a decrease in size of the fibroid treated in comparison with figure 3.

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Conclusion

Uterine fibroids are the most frequent pelvic tumors in women. When they are symptomatic they often require treatment.

EU is a safe and useful procedure for the treatment of symptomatic fibroids with an efficacy of 95% in our series.

MRI is the best imaging technique for pre-treatment evaluation and after uterine embolization.

References

1. Deshmukh SP, Gonsalves CF, Guglielmo FF, Mitchell DG. Role of MR imaging of uterine leiomyomas before and after embolization. *Radiographics* 2012;32(30):251-281
2. Bulman JC, Ascher SM, Spies JB. Current concepts in uterine fibroid embolization. *Radiographics* 2012;32(15):1735-1750
3. Pelage JP, Cazejust J, Pluot E, et al. Uterine fibroid vascularization and clinical relevance to uterine fibroid embolization. *Radiographics* 2005;25(18):99-117.
4. Stewart EA. Uterine fibroids. *Lancet* 2001;357 (9252):293-298.
5. Viswanathan M, Hartmann K, McKoy N, et al. Management of uterine fibroids: an update of the evidence. Evidence report/technology assessment no. 154, AHRQ publication no. 07-E011. Rockville, Md: Agency for Healthcare Research and Quality, 2007.
6. Katsumori T, Nakajima K, Tokuhira M Gadolinium-enhanced MR imaging in the evaluation of uterine fibroids treated with uterine artery embolization. *AJR Am J Roentgenol* 200;177:303- 307
7. Spielmann AL, Keogh C, Forster BB, Martin ML, Machan LS. Comparison of MRI and sonography in the preliminary evaluation for fibroid embolization. *AJR Am J Roentgenol* 2006;187(6):1499-1504.
8. Gonsalves c. Uterine Artery Embolization for Treatment of Symptomatic Fibroids. *Semin Intervent Radiol* 2008;25:369-377.
9. Pelage JP, Cazejust J, Pluot E, et al. Uterine fibroid vascularization and clinical relevance to uterine fibroid embolization. *RadioGraphics* 2005;25(spec no):S99-S117.
10. Verma SK, Gonsalves CF, Baltarowich OH, Mitchell DG, Lev-Toaff AS, Bergin D. Spectrum of imaging findings on MRI and CT after uterine artery embolization. *Abdom Imaging* 2010;35(1):118-128.