

## **Magnetic Resonance guided Focused Ultrasound Surgery (MRgFUS) for uterine fibroids: our experience on patients' eligibility.**

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## Learning objectives

The aim of our work is to discuss the clinical and technical eligibility for MRgFUS of women with symptomatic uterine fibroids emphasizing the lack of knowledge of this technique among both patients and physicians.

## Background

Uterine leiomyomas are the most common benign tumor in women of childbearing age. Approximately 25% of women with fibroids experience symptoms such as heavy bleeding, pelvic pain, and pregnancy complications.

To date both medical and surgical approaches for fibroids treatment are available. Uterine-sparing technics, such as **myomectomy** and uterine artery embolization (**UAE**), are usually preferred by women of childbearing age.

**MRgFUS** represents a feasible, effective, and completely non-invasive thermal ablation procedure that may be alternatively used as a fertility-preserving technique in selected cases. It was approved by the European Community (CE) in 2002 and by the Food and Drug Administration (FDA) in 2004. To date, no absolute inclusion criteria have been defined to establish treatment indications and most cases are referred for MRgFUS treatment after many clinical and imaging examinations.

## Findings and procedure details

From June 2012 to August 2013, **29 outpatients' women** (mean age  $43.14 \pm 5.96$  years) with symptomatic uterine fibroids were considered clinically eligible for MRgFUS by a general practitioner or a gynecologist and underwent pretreatment pelvic MR through a 1.5-T MRI scanner before and after i.v. medium contrast injection to determine candidacy for the procedure.

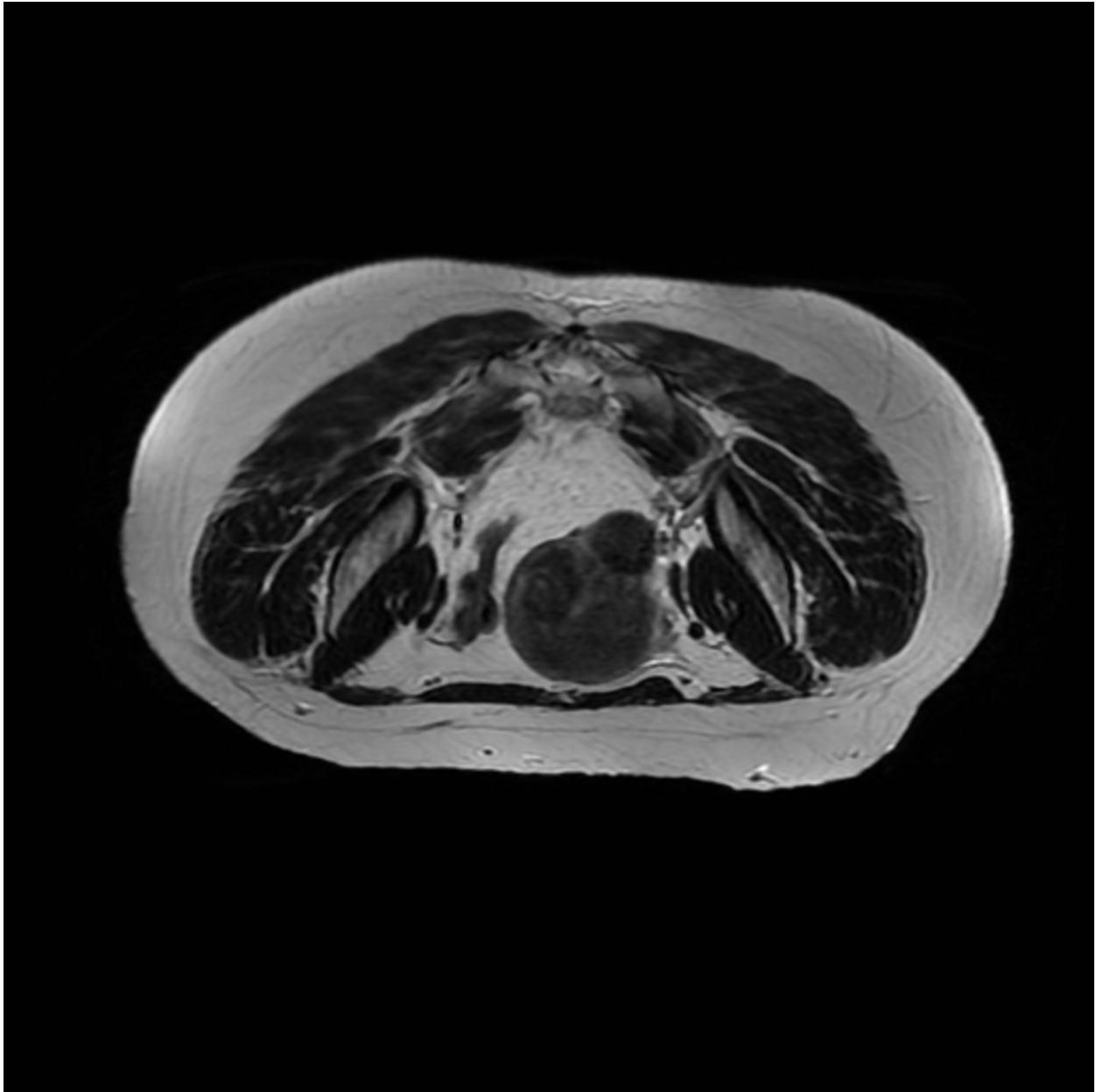
Most frequent reasons for ineligibility were: thickness of subcutaneous fat layer, not avoidable bowel interposition, extensive and/or irregular cutaneous scars, fibroid size ( $< 2.5$  cm), number of lesions to treat ( $> 5$  clinically significant fibroids), structure (bright fibroids on FSE-T2w images, non-enhancing fibroids on FSE-T1w+Gd, fibroids with heavily calcified areas) and location of the lesions (sacrum bone proximity, depth  $> 14$

cm from the skin line), diffuse adenomyosis, uterine size (>24cm without the cervix) and poor patient's compliance.

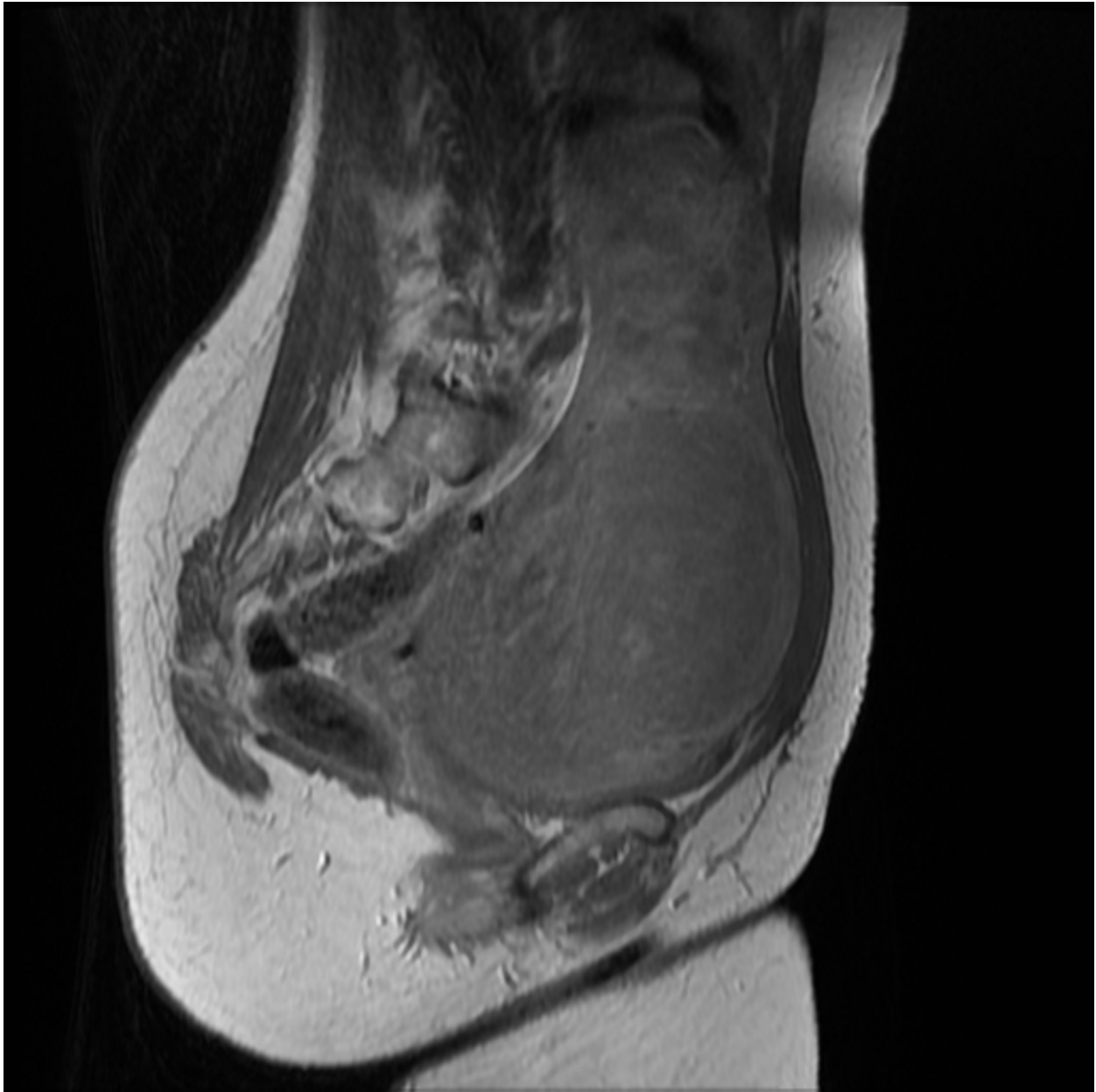
Of the 29 patients, 13 were technical eligible (11 were treated and 1 of the treated patients underwent myomectomy anyway) and 16 were ineligible. Among these, 11 could avoid undergoing pretreatment pelvic MR since one or more than one reason of ineligibility could be detected through an accurate clinical examination and/or by ultrasound imaging. We found 2 patients with extensive and/or irregular cutaneous scars, 2 with more than 5 clinically significant fibroids, 2 with too small fibroids, 1 peduncolated fibroid with a small stalk, 1 asymptomatic patient, 1 with a known cervix mass, 1 patient with diffuse adenomyosis, 1 patient with a >20cm uterine size and 1 non compliant (mentally retarded) patient.

4 of these ineligible patients showed at least a reason of ineligibility only after MR examination was performed (thick subcutaneous fat layer, not avoidable bowel interposition, iso- or hyper-intense fibroids on FSE-T2w sequences and non-enhancing fibroids on FSE-T1w+Gd).

**Images for this section:**



**Fig. 1:** Ax FSE-T2w showing a peduncolated fibroid with a small stalk in an ineligible patient.



**Fig. 2:** Sag FSE-T1w+Gd showing a uterine length over 20 cm with multiple fibroid (only the bigger one appreciable in the picture which is 13,5 x 11,3 x 11,4 cm in size).



**Fig. 3:** Sag FATSAT-T1w+Gd showing two non enhancing (non viable) fibroids.

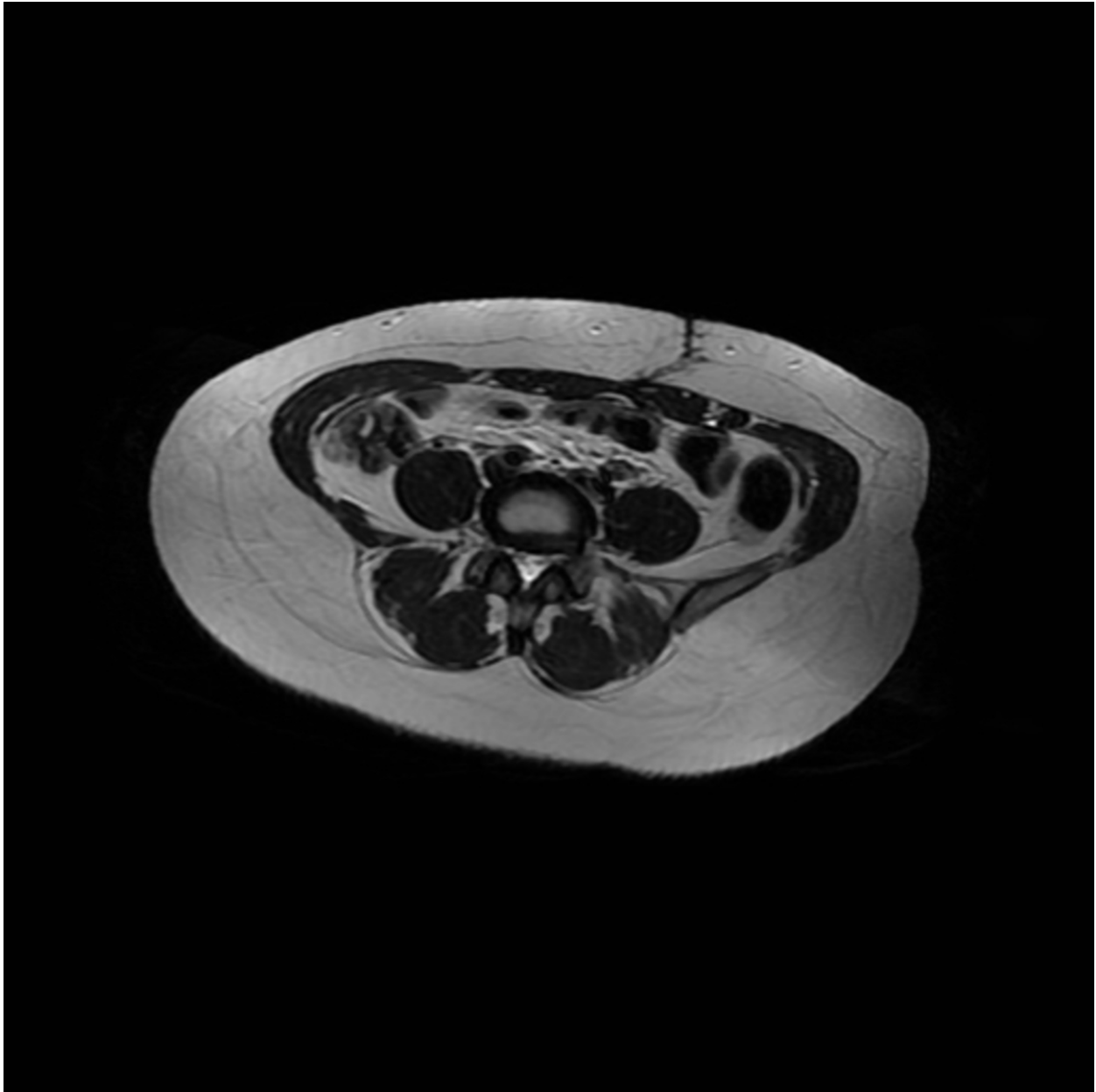


**Fig. 4:** Sag FSE-T2w showing a very heterogeneous untreatable fibroid.

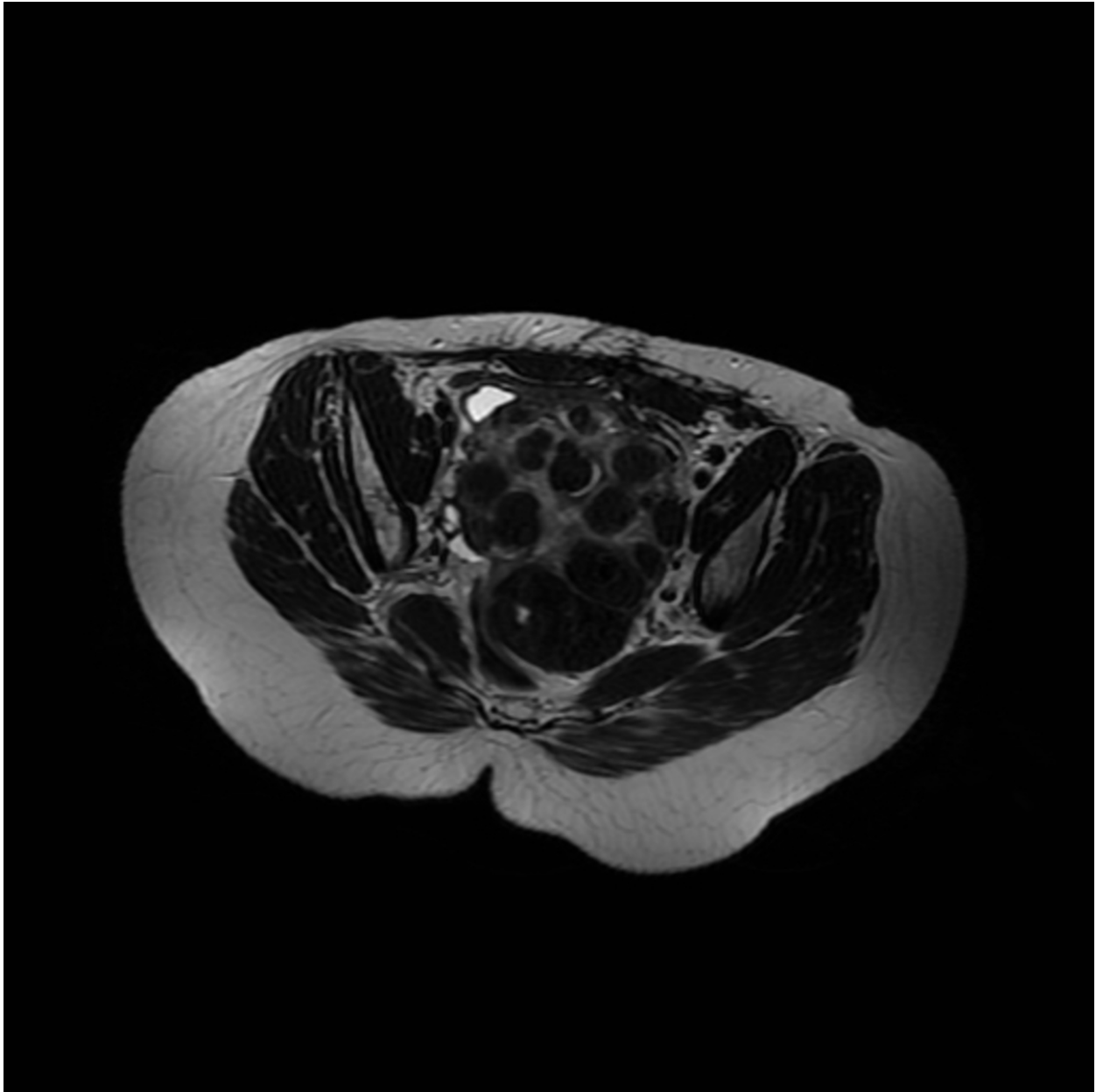


**Fig. 5:** Sag FSE-T2w showing three reasons of ineligibility: - fat layer > 3cm; - intestine in the beam path; - iso-intense fibroid.





**Fig. 6:** Ax FSE-T2w showing a extensive abdominal wall scarring.



**Fig. 7:** Ax FSE-T2w (same patient of figure 6) showing too many small clinically symptomatic fibroids.

## Conclusion

In our experience MRgFUS treatment was technically possible in less than a half (44,8%) of outpatients women with symptomatic fibroids. In 68,7% of the ineligible patients, there was a clinical ineligibility that could have been identified by the general practitioner or the gynecologist. Hence, we can speculate that this result is partially due to the lack of knowledge about of MRgFUS technique among both patients and physicians.

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