

MR guided focused ultrasound (MRgFUS)

MR guided focused ultrasound (MRgFUS) is the first and only commercially approved focused ultrasound system used for more than a decade in treating uterine fibroids. It is commercially approved for treating uterine fibroids, adenomyosis and pain alleviation of bone metastases in Europe. This technique locally targets the tissue while sparing the surrounding healthy tissue. MRgFUS is a non-invasive procedure that does not require general anesthesia and helps in speedy recovery. It provides continuous real-time monitoring of treatment.

The procedure is very safe and has lesser side effects and complications. The patient can resume back to work or carry out day-to-day activities within a day or two.

MRgFUS is a very convenient technique for the operating physician as there is no need for sterilization and requires less hours of standing. It can help in performing wide range of procedures using a single system.

Utility of MRgFUS in Gynecology - Case Study 2

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"MRgFUS is an excellent tool for treatment of gynecologic conditions"

Patient history

- A 38-year-old woman presented with complains of menorrhagia and dysmenorrhea
- She was a nulliparous Indian woman
- BMI – 25.4 with 2 intramural fibroids
- Her symptom severity score (on the score of 0–100 scale of the UFS – QoL, questionnaire) was 40 points

Findings

Screening MRI was done to evaluate suitability for MRgFUS treatment. MRI showed a fundal-intramural fibroid measuring 4.2 x 4.6 x 5 cms with a volume of 63 cc on T2WI and a smaller posterior myometrial fibroid measuring 3.3 x 3 x 3.1 cms with a volume of 20 cc (Fig. 1 A–D). Both the fibroids were homogenously hypointense on T2WI. To evaluate the viability of the fibroid as a part of routine screening, the images with contrast were acquired which showed moderate enhancement.

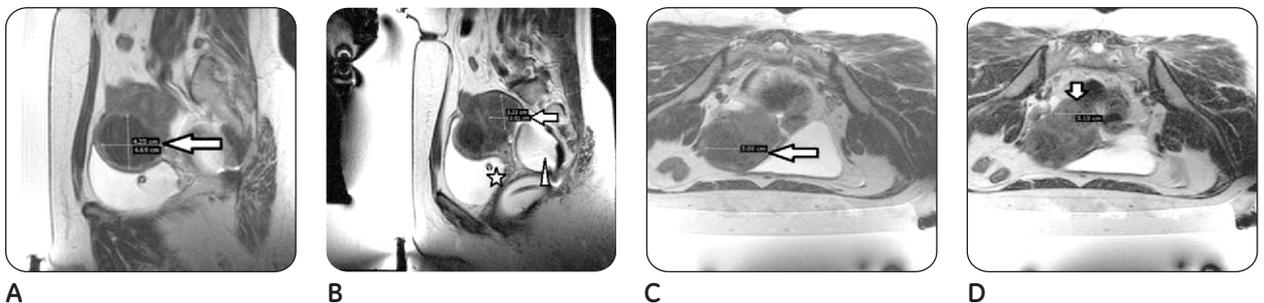


Fig. 1: Sagittal (A) & (B) and axial (C) & (D) T2 weighted images acquired during treatment planning showing fundal intramural fibroid measuring 4.2 x 4.6 x 5 cms (long arrow) and smaller posterior wall intramural fibroid measuring 3.3 x 3 x 3.1 cms (short arrow). Note the inflated rectal (arrow head) and urinary catheter (*) bringing the uterus close to the anterior abdominal wall

Technique

After obtaining a written consent from the patient, treatment was performed under conscious sedation (one ampoule of Fentanyl) to reduce motion during the procedure. To remove the obstruction resulting from the presence of bowels between the transducer and myoma, the bladder was filled using Foley's catheter using 150 cc of saline. A rectal balloon was placed and as it was inflated the bladder was synchronously emptied to push the uterus towards the anterior abdominal wall (Fig. 1 A & B).

T2 weighted images were acquired for planning. Treatment duration was 1 h (from first to last sonication) utilizing 26 focal spots or sonications with a mean energy of 2089 J and a frequency of 1.15 MHz. Temperature achieved was in the range of 55–75°C. Contrast enhanced spoiled gradient recalled acquisition in the steady state (SPGR) images were acquired post treatment which showed a non-perfused volume of 57 cc for the fundal fibroid and 17 cc for the posterior myometrial fibroid (Fig. 2 E & F) achieving an NPV ratio of 90% and 85% respectively.

Treatment was completed without complications and the patient was discharged after 30 mins after removing the rectal balloon and Foley's catheter. On immediate follow-up the next day, the patient had no complains of any adverse reactions of the treatment.

On follow-up after 6 months, the patient had significant reduction in symptoms. Her symptom severity score was 20. Follow-up MRI scan showed a decrease in the size of fibroids. The fundal fibroid measured 3.1 x 3.17 x 4.4 cms and the posterior fibroid measured 2.7 x 2.2 x 1.5 cms (Fig. 1 G & H).

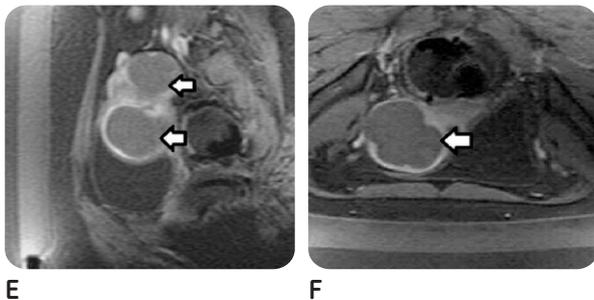


Fig. 1 (E & F): Contrast enhanced spoiled gradient recalled acquisition in the steady state (SPGR) sagittal (E) & axial (F) MR of the pelvis after MRgFUS treatment showed non enhancing area (arrows) corresponding to non-perfused

Fig.1 (G & H): Sagittal (G) and axial (H) T2WI images obtained 6 months after MRgFUS treatment shows regression of the both the fibroids in all 3 planes. The anterior wall fibroid (long arrow) measures 3.1 x 3.17 x 4.4 cms and the posterior wall fibroid (short arrow) measures 2.7 x 2.2 x 1.5 cms

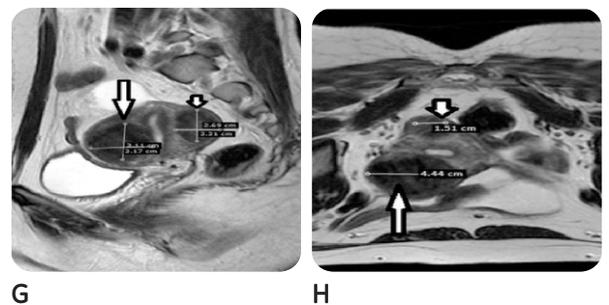


Image courtesy of GSL Medical Trust

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