

## **Prediction of long term success rates of MRgFUS for uterine fibroids**

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### **Background and Purpose:**

Uterine fibroids are the most common benign tumors of the female pelvis and are symptomatic in 20-40% of women. Treatment options vary from radical surgical procedures through minimally invasive procedures to watchful waiting. With more women seeking more conservative alternatives, MRgFUS is gaining increasing popularity as an ambulatory non-invasive thermal ablation technique for the treatment of uterine fibroids. The aim of this study was to assess the long term outcome in patients with symptomatic uterine fibroids treated by MRgFUS and to define factors associated with treatment success or with the need for alternative treatments following MRgFUS.

### **Materials and Methods:**

The study group consisted of patients with symptomatic uterine fibroids referred for commercial treatment by MRgFUS at the Sheba Medical Center from Aug. 2003 to Dec. 2007. Patients' data from the first visit, screening MRI and treatment results were retrospectively assessed from their files. All patients were interviewed by phone between 1-3/2008 concerning fibroid-related symptoms post treatment, their satisfaction with the procedure and their need for further treatment. Parameters assessed included age, BMI, symptoms, no. of fibroids, total fibroid volume, fibroid texture on T2 weighted images, treated volume as seen on post treatment CET1weighted images-non-perfused volume (NPV). Statistical analysis included  $\chi^2$  analysis or two-tailed Fisher's exact test for categorical variables and Student's *t*-test for continuous variables. Unconditional logistic regression analyses (SAS 9.1; SAS Institute Inc., Cary, NC) were performed, with surgical treatment after MRgFUS as the dependent variable.

### **Results:**

91 patients were commercially treated between Aug. 2003 and Dec. 2007. 75 patients were included in the analysis (the rest were either lost to f/u, did not receive treatment due to bowel obstructing the treatment pathway, difficulty in prolonged lying down or NPV < 10%). Mean follow-up period was 36 +/- 15 months. Patients' characteristics are summarized in table 1.

	Mean $\pm$ SD	Range
Age (yrs.)	45.8 $\pm$ 4.4	36 - 58
BMI	24.9 $\pm$ 4	17.8 - 35.3
No. of fibroids	3 $\pm$ 4	1 - 12
Total fibroid volume (ml <sup>3</sup> )	212.6 $\pm$ 139	23.5 - 587.5
No. of treatments	1.5 $\pm$ 0.6	1 - 4
NPV (%)	40.9 $\pm$ 20.9	10-100

Table 1: Patient characteristics (N=75)

Nineteen patients (25.3%) needed additional treatments: 14 underwent hysterectomy (18.6%), 4 underwent myomectomy (5.3%) and one underwent UAE (1.4%). Five patients (6.6%) underwent insertion of a levonorgestrel IUD due to persistent irregular bleeding. In a univariate and multivariate analysis treatment failure was associated with younger age, iso or hyperintense fibroid, heterogeneous fibroid on MR and NPV $\leq$ 45% at the end of the treatment.

In another model, we attempted to assess whether there is a correlation between the number of risk factors (iso or hyperintense fibroid, heterogeneous fibroid on MR and NPV $\leq$ 45%), patients' age and surgical intervention. Patients with hypointense, homogenous fibroids with NPV $>$ 45% were defined as having no risk factors. In younger patients (36-40) we found a clear correlation between the number of those risk factors and further surgical intervention. Although this trend was found in older patients too, it was less significant and the rates of hysterectomy were lower among older patients.

### **Conclusions:**

MRgFUS treatment of symptomatic uterine fibroids can offer long term relief of symptoms with success rates of 75%.

Success rates depend on the type of fibroid as observed on MRI (hypointense, homogeneous), the extent of tissue ablation (NPV  $>$  45%) and patient's age. The definition of fibroid parameters associated with treatment success should allow better patient's counseling and improved treatment outcome.