SIX MONTHS POST MR GUIDED FOCUSED ULTRASOUND SURGERY OF UTERINE LEIOMYOMA: CORRELATION OF VOLUME CHANGE WITH NON-PERFUSION TREATMENT VOLUME AND SONICATION NUMBER
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PURPOSE
To evaluate the effect of MR guided Focused Ultrasound (MRgFUS) treatment on leiomyoma volume 6 months post-treatment, and to correlate volume change with initial leiomyoma size, non-perfused volume, total number of sonications, and therapeutic treatment temperatures.

METHOD AND MATERIALS
This is a retrospective analysis of MRgFUS in 31 fibroids (22 patients), part of a prospective phase III trial, with symptomatic leiomyomas who underwent MRI prior to, immediately after, and 6 months after MRgFUS. MR images were obtained using a 1.5-T magnet (GE Medical Systems). MRgFUS was based on T2-weighted outline of the target volume. Therapeutic sonications were delivered with MRgFUS system (ExAblate 2000, Insightec Inc.). Temperature-sensitive MR imaging was performed during the sonication to monitor tissue localization and temperature. Using 3D Slicer software, leiomyoma volume was calculated before and 6 months after treatment. The non-perfused tissue volume was calculated immediately after and 6 months after treatment. Therapeutic sonications were defined as sonications within 10% of peak power. Mean temperature of a sonication was the average of a 3X3 voxel region of interest around the hottest value. Statistical methods used two-sample Wilcoxon signed rank and Spearman’s rank coefficient.

RESULTS
There is a significant 12.5% decrease in leiomyoma volume at 6 months post treatment (p=0.008). There is a moderate correlation between non-perfused leiomyoma treatment volume and sonication number (r=0.05) and mean and peak treatment temperature >55oC (r=0.06). Low negative correlations exist between leiomyoma volume change and initial size (r=-0.3), non-perfused leiomyoma volume at treatment (r=-0.3), 6 months post-treatment (r=-0.4), sonication number (r=-0.3) and mean (r=-0.3) and peak (r=-0.4) treatment temperature >55oC.

CONCLUSIONS
MRgFUS of uterine leiomyomas reduces leiomyoma volume 6 months post-treatment. A moderately positive correlation exists between non-perfused treatment volume and sonication number and treatment temperature. However, there is a low correlation between volume change and initial leiomyoma size, non-perfused volumes, sonication number and therapeutic treatment temperature.