Osteoid Osteoma: Magnetic Resonance guided High Intensity Focused Ultrasound for entirely non-invasive treatment. A prospective developmental study.

Fulvio Zaccagna[1], Michele Anzidei[1], Fabrizio Boni[1], Luca Bertaccini[1], Alessandro Napoli[1], and Carlo Catalano[1]
[1]*Department of Radiological, Oncological and Pathological Sciences, University of Rome – Sapienza, Rome, Rome, Italy*

Purpose

To determine the efficacy of MR-guided Focused Ultrasound Surgery (MRgFUS) treatment of symptomatic osteoid osteomas.

Materials and Method

This prospective, IRB approved study involved 15 consecutive patients (11 m; 4f; mean age, 21) with clinical and imaging diagnosis of Osteoid Osteoma; all patients underwent MRgFUS ablation (ExAblate, InSightec; Discovery 750 MR unit, GE). Lesions located in the vertebral body were excluded, while lesions in proximity to joints or neurovascular bundles were included. Treatment success was determined at clinical and imaging follow-up at 1, 6 and 12 months post-treatment. A visual Analog Pain Score (VAS) was used to assess changes in symptoms. Bone changes at nidus site were evaluated on the basis of CT and dynamic ce-MR imaging (Gd-Bopta; Bracco) pre- and post-treatment.

Results

Treatment was carried out using a variable number of sonications (4±1.8) with a mean energy deposition of 866±211J. There were no treatment- or anesthesia-related complications. A statistically significant difference($p=0.001$) was noted between pre- and post-treatment VAS scores (8.3±1.6 vs 0.6±1.5, respectively). Two treatments were conducted in patients with prior CTgRFA failure and needed two different sessions to achieve complete clinical success. At imaging, edema and hyperemia gradually disappeared in all lesions. No apparent relationship between nidus vascular extinction and successful outcome was found. Variable reabsorption degree of sclerotic reaction was observed with nidus disappearance in 4 cases (27%).

Conclusion

Treatment of osteoid osteoma using MRgFUS can be performed safely with a high rate of success and without treatment related morbidity; our results indicated also a positive trend to bone rearrangement after treatment.