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THE POTENTIAL ROLE OF FOCUSED ULTRASOUND IN NEUROSURGERY

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Resumen

Solving the problem of delivery of therapeutic ultrasound through the skull has been an important scientific advance. We have used magnetic guided focused ultrasound (MRgFUS) targeting the motor thalamus or pallidum patients with movement disorders. These procedures have been done under local anesthesia with ongoing motoring of the patient's symptoms. The application of focused ultrasound can also be used in mapping, for example, producing paresthesias at low levels of sonication in the sensory pathways and producing transient therapeutic effects at sub lesion threshold sonication parameters. During sonications there is real time visualization of the volume of tissue affected and the focal temperature and using MR tomography. In some patients there were technical issues related to skull thickness and the difficulty in delivering enough energy. Notwithstanding these difficulties in the large majority of patients it is possible to make therapeutic lesions which are clinically effective and have a rate of adverse effects and clinical benefit similar to that achieved with more invasive techniques that use mapping and radiofrequency lesions. MRgFUS may represent a significant advance in the treatment of movement disorders. In the future we hope to be able to treat other brain targets and to also expand the indication beyond movement disorder to other functional disorders including perhaps pain, epilepsy and cognitive and psychiatric illness and opening the blood brain barrier.

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