Editorial

Magnetic resonance–guided focused ultrasound

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In this issue of *Neurosurgical Focus*, Monteith et al.¹ describe an ultrasonic technique for the minimally invasive treatment of spontaneous intracerebral hemorrhage. Historically, this pathological entity has carried a poor prognosis, and its treatment has become the subject of heated debate in the neurosurgical community. In this report, the authors detail an MR-guided technique in which multiple ultrasound beams pass through the calvaria and brain to a deep hemorrhage. Magnetic resonance–guided focused ultrasound (MRgFUS) therapy, through the disruptive forces of multiple ultrasound beams, liquefies the clot and allows its subsequent, minimally invasive aspiration through a bur hole and catheter. Animal and cadaveric studies have delineated no injury to the surrounding brain with the use of this technique. Current drawbacks to this technique include the costs of the MRgFUS system and 3-T MRI, as well as that of the trained, additional staff to operate and troubleshoot the equipment. In addition, current technology allows treatment of lesions

only more than 2 cm from the calvarial surface. The potential utility and efficacy of this treatment are promising. Current techniques, including medical management and open cranial decompressive surgeries, are fraught with drawbacks and questionable efficacy. As the authors allude to in their paper, the utility of this ultrasonic technique can only be verified by a pilot clinical trial. Similar techniques have also been applied in a number of other clinical scenarios, including the ultrasonic treatment of metastatic and primary brain tumors as well as functional diseases such as essential tremor and Parkinson disease. The broad applicability of this technology has opened yet another exciting door in the future of neurosurgery.

Disclosure

The author reports no conflict of interest.

Reference

1. Monteith SJ, Kassell NF, Goren O, Harnof S: Transcranial MR-guided focused ultrasound sonothrombolysis in the treatment of intracerebral hemorrhage. *Neurosurg Focus* 34(5):E14, 2013

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