Magnetic resonance guided focused ultrasound for dystonia

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Magnetic Resonance-Guided Focused Ultrasound (MRgFUS) is an emerging, non-invasive treatment modality for various movement disorders, including certain forms of dystonia. This technique utilizes high-intensity ultrasound waves, precisely focused on specific brain regions, to ablate targeted tissues without the need for surgical incisions. Real-time MRI guidance ensures accurate targeting and monitoring throughout the procedure.

Applications in Dystonia:

Focal Hand Dystonia: A pilot study demonstrated that MRgFUS thalamotomy targeting the ventro-oral (Vo) nucleus significantly alleviated symptoms in patients with focal hand dystonia. The benefits persisted over a 12-month follow-up period, with minimal adverse effects reported. NEUROLOGY OPEN

Cervical Dystonia: Research indicates that MRgFUS can be effective in treating cervical dystonia. A study involving 13 patients reported a 70.6% improvement in symptom severity, as measured by the Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS), over an average follow-up of 13.3 months. Some patients experienced mild, transient side effects. ANNALY NEVROLOGII

Advantages:

Non-Invasive: MRgFUS does not require incisions, reducing the risks associated with traditional surgical procedures.

Precision: MRI guidance allows for accurate targeting of specific brain regions, minimizing damage to surrounding tissues.

Reduced Recovery Time: Patients typically experience shorter recovery periods compared to conventional surgery.

Considerations:

Patient Selection: Not all dystonia patients are suitable candidates for MRgFUS. Factors such as the

type and severity of dystonia, as well as individual anatomical considerations, play a role in determining eligibility.

Availability: As a relatively new treatment, MRgFUS may not be widely available in all medical centers.

Long-Term Efficacy: While initial studies are promising, further research is needed to assess the long-term effectiveness and safety of MRgFUS for dystonia.

In summary, MRgFUS represents a promising advancement in the treatment of certain types of dystonia, offering a non-invasive alternative with encouraging preliminary outcomes. However, comprehensive evaluation and consultation with a specialized medical team are essential to determine its suitability for individual patients.

A scoping review was conducted using the Preferred Reporting Items for Systematic reviews and Meta-analysis Extension for Scoping Reviews (PRISMA-ScR) guidelines. Data available on MRgFUS use in the management of different types of dystonia were extracted.

There is limited data available (n = 11). In the surveyed literature, MRgFUS has consistently shown clinical benefit in patients with dystonia. It is an emerging avenue of treatment and has its challenges.

This scoping review highlighted the early but encouraging applications of MRgFUS in dystonia management. While data was limited, existing studies consistently demonstrated positive clinical outcomes. The non-invasive and precise nature of MRgFUS positions it as a promising avenue for further research, despite the challenges associated with its emergent status. This review sets the stage for future inquiries, emphasizing its potential as a valuable tool in dystonia treatment [1)]

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Guinal SM, Jamora RDG, Khu KJO, Aguilar JA. Magnetic resonance-guided focused ultrasound in dystonia: a scoping review. Neurol Sci. 2024 Nov 20. doi: 10.1007/s10072-024-07882-1. Epub ahead of print. PMID: 39562491.