Editorial
Volume 8:1, 2022

Epilepsy Journal

ISSN: 2472-0895 Open Access

Editorial Note on New Form of Brain Surgery

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Editorial

Researchers have developed a non-invasive way to remove defective brain circuits that could allow doctors to treat debilitating neurological diseases without the need for conventional brain surgery. The UVA team, together with associates at Stanford University, indicate that the approach, if successfully restated to the operating room, could revolutionize the treatment of some of the most challenging and complex neurological conditions, including epilepsy, movement diseases and more. The approach uses low-intensity concentrated ultrasound waves combined with micro-bubbles to compactly access the brain's natural defences and allow the targeted delivery of a neurotoxin. This neurotoxin kills the culprit brain cells while sparing other healthy cells and conserving the girding brain architecture.

"This new surgical strategy has the implicit to supplant being neurosurgical procedures used for the treatment of neurological diseases that do not respond to drug," said researcher. This unique approach eliminates the diseased brain cells, spares conterminous healthy cells and achieves these issues without indeed having to cut into the scalp."

The power of PING

The new approach is called PING, and it has formerly demonstrated instigative potential in laboratory studies. For case, one of the promising operations for PING could be for the surgical treatment of epilepsies that don't respond to drug. Approximately a third of cases with epilepsy don't respond to anti-seizure medicines, and surgery can reduce or eliminate seizures for some of them. Researcher's team, along with their collaborators at Stanford, has shown that PING can reduce or exclude seizures in two research models of epilepsy. The findings raise the possibility of treating epilepsy in a precisely-targeted and non-invasive manner without the need for traditional brain surgery.

Another important potential advantage of PING is that it could encourage the surgical treatment of applicable patients with epilepsy who are reticent to undergo conventional invasive or ablative surgery. In a new scientific paper in the Journal of Neurosurgery, researcher and his collaborators detail the capability of PING to focally exclude neurons in a brain region, while sparing non-target cells in the same area. In contrast, presently available surgical approaches damage all cells in a treated brain region.

A crucial advantage of the approach is its incredible precision. PING harnesses the power of magnetic-resonance imaging (MRI) to let scientists blink inside the cranium so that they can precisely guide sound waves to open the body's natural blood-brain barrier exactly where demanded. This barrier is designed to keep dangerous cells and molecules out of the brain, but it also prevents the delivery of potentially beneficial treatments. The UVA group's new paper concludes that PING allows the delivery of a highly targeted neurotoxin, cleanly wiping out problematic neurons, a type of brain cell, without causing contributory damage.

Another crucial advantage of the perfection of this approach is that it can be used on irregularly shaped targets in areas that would be extremely difficult or impossible to reach through regular brain surgery. However, "the non-invasive nature and particularity of the procedure could appreciatively impact both physician referrals for and patient confidence in surgery for medically intractable neurological diseases. "Our hope is that the PING strategy will come a key element in the coming generation of very precise, non-invasive, neurosurgical approaches to treat major neurological diseases," said researcher, who's part of the UVA Brain Institute [1-5].

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How to cite this article: Rasa, Emeliya. "Editorial Note on New Form of Brain Surgery." Epilepsy J 8 (2022): 152.

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Received 06 January, 2022; Manuscript No: elj-22-53172; **Editor assigned:** 08 January, 2022, PreQC No: P-53172; **Reviewed:** 19 January, 2022, QC No: Q-53172; **Revised:** 24 January, 2022, Manuscript No: R-53172; **Published:** 29 January, 2022, DOI: 10.37421/elj.2022.8.152