Magnetic seizure therapy is a novel form of focal convulsive treatment wherein magnetic field passes through the scalp and skull without impedance. In many ways, it has the potential to be superior to electroconvulsive therapy (ECT) as the anesthesia-associated side effects and cognitive impairments are less. It also may be an alternative for those who do not opt for ECT because of the stigma associated with it.

HISTORY OF MAGNETIC SEIZURE THERAPY

TMS has been known to induce seizures, following which it was envisaged that combining the subconvulsive doses of repetitive Transcranial Magnetic Stimulation (rTMS) and antidepressant effect of ECT would yield superior results to either of the two.[2] Before application on humans, magnetically induced seizures were tested on Rhesus monkeys in 1998 and later on nonhuman primates. Human trial of MST was first done by Lisanby et al. in 2001 in Bern, Switzerland.[3]

MST in many ways is similar to ECT. It requires approximately the same preparation and infrastructure as ECT. However, it is administered by a modified TMS device, which can administer higher output compared to the conventional TMS devices. The MST procedure is performed under general anesthesia with a muscle relaxant.[1]
surge. Two types of MST devices are available; MagPro MST device manufactured by MagVenture and MagStim MST device manufactured by MagStim.[1]

**PROBLEMS WITH ELECTROCONVULSIVE THERAPY**

ECT, though an established treatment modality for schizophrenia and depressive disorders, comes with its share of shortcomings. First, in ECT, the control over distribution of electric current inside the cranial vault is limited as most of the current is shunted through the scalp and cerebrospinal fluid away from the brain.[2] Second, it causes cognitive adverse effects, namely amnesia, executive dysfunction, and disorientation. At last, social stigma associated with the use of ECT which prevents acceptance of ECT among patients.[4] Furthermore, large-scale reviews on adverse effects of ECT have shown that ECT has a negative effect on neurocognitive function of the patient.[5] In comparison to clozapine monotherapy, ECT combined with clozapine showed decrease in the processing speed and verbal learning of the patients.[6]

**BENEFITS OF MAGNETIC SEIZURE THERAPY**

MST has been proven to be effective in patients of treatment-resistant depression with suicidal ideation.[7] It is associated with less cognitive side effects than with ECT as the seizures produced by MST are more focal. It also causes less retrograde and anterograde amnesia than ECT. There is a lesser requirement of muscle relaxants such as succinylcholine than in ECT as the intensity of seizures produced is less in comparison to ECT, thereby shortening the period of paralysis and thus reducing the chances of respiratory depression.[8] In MST, there is no need of bite block which is conventionally used in ECT as there is no stimulation of masseter muscle by the current which gets shunted.[2] At last, it may be beneficial in patients who are wary of ECT due to the stigma associated with it.[4,9]

**ADVERSE EFFECTS**

The adverse effects produced by anesthesia and generalized seizures are common to both MST and ECT.[8] The clicking noise generated by the MST magnetic coil may potentially cause hearing loss. Hence, to prevent the same, both the treating team and the patient wear earplugs.[10]

**FUTURE OF MAGNETIC SEIZURE THERAPY**

Currently, no clinical algorithms exist for MST, and the therapy is not FDA approved and it still in its experimental stages. Review of existing literature revealed that much needs to be done to unequivocally establish the efficacy and safety of MST before it becomes a viable alternative for ECT.

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There are no conflicts of interest.

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