National Alliance on Mental Illness
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Transcranial Magnetic Stimulation (TMS or rTMS)

The NeuroStar, a device that performs TMS, is a new way to approach the problem of major depression and was cleared by the FDA in October of 2008. TMS, as a generic procedure, was not approved by the FDA. Rather, a specific device that performs TMS, the NeuroStar, was cleared by the FDA. TMS offers a unique treatment option for individuals in a specific phase of illness and treatment.

TMS is an outpatient intervention which could be an option for individuals diagnosed with major depression who have failed one trial of an antidepressants at an adequate dose and duration. In clinical trials, individuals had been treated with an average of five medication treatment attempts, one of which was at an adequate dose and duration. TMS has not been thoroughly studied for people who have failed two or more adequate trials of antidepressants or for people who have not been on antidepressants. TMS is not indicated for individuals who have bipolar disorder, depression with psychosis or individuals with a high risk of suicide.

TMS is approximately a 40-minute procedure conducted in an outpatient office using a specific technology. The procedure, given daily, occurs over a four-to-six-week period. The TMS device sends magnetic pulses to the frontal left side of the brain which generates weak electrical currents. These magnetic pulses are similar to what one would experience in getting a magnetic resonance image (MRI) of the brain.

The theory of the treatment is that the resulting electrical currents activate neurotransmitters implicated in the symptoms of depression—serotonin, norepinephrine and dopamine. Studies have shown that the frontal left side of the brain is the area that can be underactive in individuals with major depression, hence the rationale for the site of the stimulation.

In a randomized, controlled clinical trial with individuals who had not adequately benefited from prior antidepressant medication, patients treated with TMS experienced a significantly greater improvement in symptoms than patients treated with placebo. In an open-label trial, which is most like real-world clinical practice, 54 percent of individuals treated with TMS experienced a significant improvement in symptoms.

TMS requires no anesthesia or sedation, has a low rate (about 5 percent) of discontinuation due to adverse effects (most commonly headache) and has no systemic side effects typically with oral antidepressant therapy (such as sexual side effects, weight gain, nausea, constipation or dry mouth). Medical devices such as pacemakers or metal objects in one's head prevent the use of TMS. Seizure risk can be raised by TMS. There are no long-term studies of the effects of TMS or rTMS.

At this time, there is more research being conducted on the intervention. TMS is new and, like all new treatments, the field is still sorting out its best uses and downsides. Academic medical centers are most familiar with this intervention and may conduct research studies on TMS. Individuals interested in this—or any other new treatment—are encouraged to review any emerging information from research and clinical practice with a doctor.

Summary: TMS offers a unique profile in the treatment of a specific phase of major depression and, as a field, many health care providers believe they have more to learn about it over time.

Reviewed by Ken Duckworth, M.D., October 2009

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