

Repetitive Transcranial Magnetic (rTMS) - Neuromodulation treatment for Depression

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Abstract:

Repetitive Transcranial Magnetic stimulation (rTMS) is a non-invasive, medication free neuro-modulatory treatment which is providing a ray of hope for the patients suffering from depression and anxiety disorders. rTMS has proven successful in treating treatment resistant depression as well as drug naive cohort.

Introduction:

Repetitive Transcranial Magnetic (rTMS) is the cutting-edge treatment for depression and anxiety. NICE has approved rTMS for depression treatment in 2015. The Royal college of psychiatrists recommended it in 2017. rTMS has been used worldwide at least over a decade with good success results. FDA has recently approved rTMS for Obsessive Compulsive Disorder.

Until now, the traditional mode of treatment for depression was psychopharmacology mainly antidepressants, ECT in severe cases and psychological therapy. There was still a part of population who was failing to respond to all these treatment options.

To this disadvantaged group, neuromodulation therapies like rTMS can be offered now. Looking at various RCTs, rTMS has now a place in the treatment depression specially to treat treatment resistant depression (Dunner et al, 2014).

Advantages:

rTMS is quick to work. It's a medication free treatment. It is non-invasive and cost-effective treatment. This can be combined safely with antidepressants. Patients can come driving. Their routine is unchanged.

How does rTMS works?

Repetitive transcranial magnetic stimulation works on Faraday's law. A magnetic coil is placed on the head and magnetic pulses are delivered to the brain which creates electrical field which in turn stimulates nerve cells in that part of the brain. Magnetic impulses travel 2-3 cm wide and down the brain-targeted point. These impulses generate electric current which in turns stimulates under performing nerve cells in the localized areas.

rTMS works by stimulation of underperforming nerve cells which controls mood and emotions (Dorsolateral prefrontal

cortex). It enhances neuroplasticity of thalamocortical circuits. This is the area which is involved in depression and anxiety. rTMS enhances synaptic plasticity. It changes in blood flow and metabolism at the site of the stimulation. rTMS also increases grey matter volume. It also affects BDNF upregulation.

Indications:

Depression, Bipolar depression, Post-partum depression. Depression associated with Fibromyalgia, chronic pain etc., Generalised anxiety disorder, Obsessive compulsive disorder.

Side effects:

This treatment has minimal side effects most common being headache and facial twitches during the treatment being the most common. Other side effects are as follows-

- Discomfort at the site of stimulation and scalp discomfort,
- Transient hearing loss
- Neck pain,
- Occasional agitation or increased suicidal ideas
- Rare episode of hypomania especially in patients with Bipolar disorder.
- Rare side effect of seizure (1 in 30,000).

Success rate:

Our (Tranquil TMS clinic) recent audit showed that our clinic's remission rates for Depression with rTMS was high (37.03%) and comparable to a study done by Connolly et al in 2012 which showed a remission rate of 35.3%.

However, our response rate of 66.66% was higher than the response rate of 41.2% quoted in the same study and higher than the results of a meta-analysis done by Berlim et al in 2014.

Discussion:

In conclusion, this novel treatment has an important place in the management of depression and anxiety disorders. At present, this treatment is mainly available in private sectors though few NHS centers are offering rTMS on the NHS.

References:

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Author Information

Dr Nikhila Deshpande is the Founding Director and Senior Consultant Psychiatrist. She has been working in the field of psychiatry since 1993. She has extensive experience in managing various psychiatric conditions affecting adults over the age of 18. Dr Deshpande is particularly passionate about diagnosis and management of mental illnesses such as depression, anxiety and dementia. She has published several papers and has participated in research projects. She is an examiner for the MRCPsych exams for The Royal College of Psychiatrists. She founded Tranquil TMS to provide a safe and non-invasive treatment for depression and anxiety that works. She has completed rTMS training course successfully organised by Clinical TMS society which is an international organisation. Dr. Deshpande is also a member of clinical TMS society.

