Media Release: ECNP Congress, Paris *"For the science and treatment of disorders of the brain"*

Pilot study shows that neurofeedback may help treatment-resistant depression

Embargo until: 00.01 (CEST, Paris) Sunday 3rd September, 2017

A small pilot study has indicated that neurofeedback – where patients concentrate on modifying their own brainwave patterns – has potential to treat many of the 100m people worldwide who suffer from Treatment-Resistant Depression (TRD). This is the first time that neurofeedback has been shown to improve both individual symptoms and overall recovery in TRD.

According to the World Health Organisation*, "*Depression is the leading cause of disability worldwide*", with over 300m people suffering globally. There are treatments for depression, but up to a third of people don't respond to treatment, even after trying different antidepressants. This is Treatment-resistant depression (TRD). For these patients, there are limited options.

Now a new pilot study from Korea indicates that neurofeedback may be offer a viable treatment to patients suffering from TRD, if used with antidepressants. Working with 12 patients with TRD and 12 controls, the researchers put patients through 12 weeks regular training sessions, where the patients learned how to vary their brainwaves in response to audio and visual signals.

In past research, different brainwaves have been shown to be associated with different moods and brain states, so these patients were asked to concentrate on changing the levels of particular types of brainwaves as they were displayed on a computer screen. On each visit, patients received beta/sensorimotor rhythm training for 30 min, and then alpha/theta training for 30 min. Psychological progress was measured using various standard depression questionnaires** at the start of the treatment, then at 1, 4 and 12 weeks. These questionnaires showed how treatment affected such factors as interpersonal relationships, work ability, and family life.

The researchers found that in the neurofeedback group, 8 of the 12 patients responded to treatment, and 5 of those responded well enough to be classified as being in remission. Most of these patients are now under long-term observation to see if remission has continued. In contrast the control group did not show significant improvement from baseline after 12 weeks.

Project leader, Professor Eun-Jin Cheon **(**Yeungnam University Hospital, South Korea), said:

"Neurofeedback has been trialed with psychological conditions in the past, but as far as we know this is the first time that anyone has succeeded in achieving remission and overall recovery (functional recovery)with treatment-resistant depression. This is particularly important, because this is an otherwise untreatable group of patients.

In our study we included patients with major depressive disorder, who still had residual symptoms and functional impairment despite receiving antidepressant treatment. Our results suggested that neurofeedback might be an effective complementary treatment to make patients feel well again and successfully engage with life. The most promising thing about neurofeedback is it doesn't cause even mild side effects. It could also improve self-efficacy by participating active, voluntary treatment.

We need to emphasise that this is a small study – if you like, it's still at the level of clinical science

rather than clinical treatment, so we are a long way from this finding its way into the clinic. But the results surprised us, it merits further investigation"

Commenting, Henricus G Ruhe, MD, PhD, (Department of Psychiatry Radboudumc, Nijmegen, the Netherlands, and member of the ECNP Scientific Advisory Panel) said:

"This is a very interesting study targeting remaining depressive symptoms in patients who insufficiently responded to previous treatment trials of antidepressants. Although the number of included patients are small (12 treated with neurofeedback vs. 12 controls) we should consider this pilot study as promising and suggesting that alternative approaches (relative to antidepressants) might be beneficial in nonresponding depressed patients.

Further work is needed to both replicate these results and compare this strategy with alternative treatment options (e.g. psychotherapy or additional pharmacotherapeutic steps). This will enable the community to determine where neurofeedback must be positioned and/or when it should be recommended in future guidelines".

Dr Ruhe was not involved in the research.

**http://www.who.int/mediacentre/factsheets/fs369/en/*

***The questionnaires used were the Hamilton Depression Rating Scale(HAM-D), the Beck Depression Inventory (BDI-II), Clinical Global Impression-Severity (CGI-S), Euro Quality of Life Questionnaire 5–Dimensional Classification (EQ-5D), Sheehan Disability Scale (SDS)*

For background, see also: http://www.webmd.com/depression/guide/treatment-resistant-depression-what-is-treatment-resistant-depression

See notes for funding info, and how this has been reviewed

ENDS

Notes for Editors

Please mention the ECNP Conference in any story resulting from this press release

The European College of Neuropsychopharmacology (ECNP)

The ECNP is an independent scientific association dedicated to the science and treatment of disorders of the brain. It is the largest non-institutional supporter of applied and translational neuroscience research and education in Europe. Website: www.ecnp.eu

The 30th annual ECNP Congress takes place from 2nd to 5th September in Paris. It is Europe's premier scientific meeting for disease-oriented brain research, annually attracting between 4,000 and 6,000 neuroscientists, psychiatrists, neurologists and psychologists from around the world. Congress website: http://2017.ecnp.eu/

Conference Abstract; P.2.f.009 Neurofeedback treatment on depressive symptoms and functional recovery and brain-derived neurotrophic factor in treatment-resistant major depression

E.J. Cheon[1]*, J.H. Choi[1], G.W. Lee[1], B.H. Koo[1], W.S. Seo[1], H.G. Kim[1], Y.J. Lee[1], M.S. Keum[1]
[1]*Yeungnam University College of Medicine, Department of Psychiatry, Daegu, South-Korea*

Introduction: Neurofeedback treatment is proposed for the complimentary treatment of treatment- resistant depression (TRD). Some studies have reported that improvement in both depressive symptoms and executive function by neurofeedback treatment [1]. Brain-derived neurotrophic factor (BDNF) acts on certain neurons of the central nervous system and the peripheral nervous system, helping to support the survival of existing neurons, and encourage the growth and differentiation of new neurons and synapses. Previous studies suggested that an etiological link between the development of depression and BDNF exists.

Aims: We aimed to evaluate the effects of neurofeedback treatment as an augmentation treatment on depressive symptoms and functional recovery in treatment-resistant patients with major depressive disorder. The changes of BDNF before and after treatment in both group were also examined.

Methods: We included 24 adult patients with TRD in the current study. TRD refers to a patient who had persistent depressive symptoms (total scores of ≥14 on the 17-item Hamilton Rating Scale for Depression (HAMD-17)) and functional impairment despite adequate antidepressant trials. 24 patients with TRD were assigned to neurofeedback group (N=12) or control group (medication only group) (N=12). The neurofeedback group was asked to participate in 12 weeks combined therapy of medication and 12∼24 sessions of neurofeedback training. Pre- and post-treatment blood samples were taken for evaluation of serum levels of BDNF in both patient groups. The neurofeedback protocol was once or twice times a week training of both beta/sensorimotor rhythm and alpha/theta for 12 weeks. When every visit, patients were received beta/sensorimotor rhythm training for 30 min, and then alpha/theta training for 30 min. Patients were evaluated using the Hamilton Depression Rating Scale(HAM-D), the Beck Depression Inventory (BDI-II), Clinical Global Impression-Severity (CGI-S), Euro Quality of Life Questionnaire 5–Dimensional Classification (EQ-5D), Sheehan Disability Scale (SDS) at Baseline, 1, 4 and 12 week.

Results: In neurofeedback group, cumulative response and remission rates by HAM-D score were 66.7% and 42.7% at week 12, respectively. Based on change from baseline to week 12, the neurofeedback training decreased mean score on HAM-D, BDI-II, CGI-S, EQ-5D and SDS ($p<0.01$). The changes of HAM-D score, EQ-5D and SDS were significantly higher in the neurofeedback treatment group than the control group ($P<0.05$). In contrast to the neurofeedback treatment group, the control group did not show significant improvement from baseline after 12. No significant differences were found between pre- and post-treatment serum BDNF in each patient group.

Conclusion: This is the first prospective controlled study of the neurofeedback treatment on functional recovery in patients with TRD. In this study, neurofeedback treatment could improve both depressive symptoms and functional impairment significantly. Despite of small sample size, these results suggested that neurofeedback treatment can be effective augmenting treatment not only for depressive symptoms but for functional recovery in patients with TRD. Further work is required in order to evaluate there are associations between efficacy of neurofeedback treatment and serum BDNF level.

References

[1] Choi, S. W., Chi, S. E., Chung, S. Y., Kim, J. W., Ahn, C. Y., Kim, H. T., 2011. Is Alpha WaveNeurofeedback Effective with Randomized Clinical Trials in Depression? A Pilot Study.Neuropsychobiology 63(1), 43-51.

How this was reviewed?
There were 1003 abstracts accepted for this conference, this work was amongst the top-scoring 170 abstracts. After initial approval from the ECNP media group, the press release was developed by the press officer and the author, with the final version being approved by the ECNP media review group. We then sought an additional view and comment from someone with expertise in the field – this is the person who comments in the press release. None of the reviewers have been involved in the work.

Funding: This research was supported by the 2015 Yeungnam University Research Grant