TRANSCRANIAL PULSE STIMULATION (TPS) AS A METHOD FOR TREATING THE CENTRAL NERVOUS SYSTEM OF PATIENTS WITH ALZHEIMER'S DISEASE – A NEW PERSPECTIVE?

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Introduction

Dementia is one of the most common mental disorders in old age and is often associated with a high emotional distress, depressive symptoms and reduced quality of life [1, 2]. The most common cause of dementia syndrome is the Alzheimer's disease (AD) [1, 2]. Because early treatment is important this study used TPS, a low-energy shock wave treatment approved for mild and moderate AD [3]. Low-frequency sound pulses are delivered to regions of the brain to release growth factors and improve cerebral blood flow to promote and maintain cognitive performance.

The aim of the current study is to investigate the development of cognitive performance and the severity of depressive symptoms over the course of treatment with TPS in patients with AD.

Methods & Sample

Cognitive performance (Montreal Cognitive Assessment, MoCA) & severity of depressive symptoms (Geriatric Depression Scale, GDS) will be assessed at several measurement points of patients diagnosed with AD and treated with TPS in the outpatient setting of a specialised psychiatric-psychotherapeutic hospital in Germany (Lower Saxony). Data from this clinical sample will be analysed using a repeated measures ANOVA.

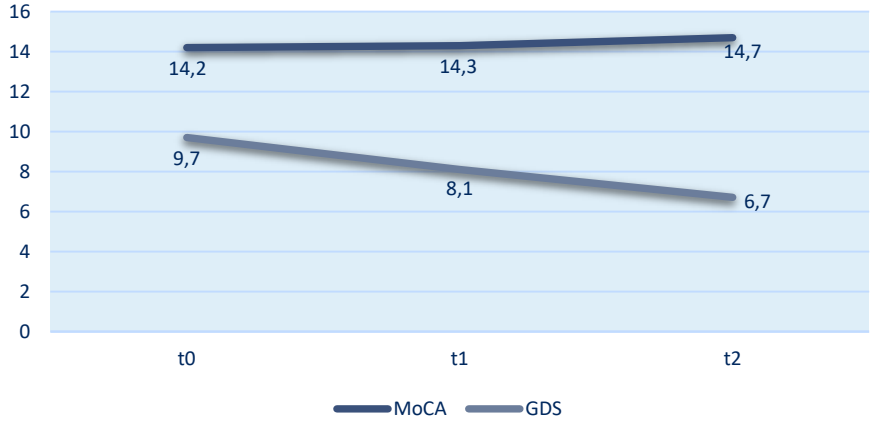
***Table 1*: Sample Characteristic**

Feature	Women n = 37 (57 %)	Men n = 28 (43 %)	Women & Men n = 65
Diagnosis AD, F00.- (ICD-10)			
F00.0: early onset, typ 2	9 (24 %)	8 (29 %)	17 (26 %) [a]
F00.1: late onset, typ 1	20 (54 %)	11 (39 %)	31 (48 %) [a]
F00.2: atypical / mixed	7 (19 %)	8 (29 %)	15 (23 %) [a]
F00.9: not specified	1 (3 %)	1 (3 %)	2 (3 %) [a]
Age			
M (SD)	70 (10.4)	71 (9.4)	71 (9.9) [b]

note: M = Mean Value; SD = Standard Deviation; [a] χ^2-test; [b] *t*-test; no significant differences between women & men

Results

***Ill. 1*: Mean Values of MoCA & GDS, measurement points t0, t1, t2, N = 36**



Repeated measures ANOVA with Mauchly-Test of Sphericity revealed **no statistically significant difference** of Mean Values for the measurement points for **MoCA** $F(2, 34) = .549$, $p = .583$, $\eta^2 = .031$

Repeated measures ANOVA with Mauchly-Test of Sphericity revealed **statistically significant difference** of Mean Values for the measurement points for **GDS**, $F(2, 17) = 4.5$, $p \leq .05$, $\eta^2 = .347$

note:
Degree of Values of MoCA < 10 = severe cognitive disturbance, 10 - 17 = moderate cognitive disturbance, 18 - 25 = mild cognitive disturbance, ≥ 26 = no or little cognitive disturbance
Degree of Values of GDS < 10 = no or little depression, 10 - 19 = mild depression, 20 - 30 = severe depression

Conclusion

The study examined the **cognitive performance** and **depressive symptom severity** of patients with an AD over the course of treatment with **TPS**. **Results indicate a minimal alteration of cognitive performance (MoCA) during the three measurement points and a reduction of depressive symptoms (GDS) in patients with AD over the course of treatment with TPS** (***Ill. 1***). The results should be seen under consideration that the study is being continued, so the results are preliminary data. However, TPS therapy is not paid for by state or private health insurance companies, patients must therefore pay for the costs themselves. Furthermore, TPS therapy should only be carried out by qualified medical staff and contraindications should be taken into account.

Like our study, some studies indicate positive effects, which can be seen in significant improvement in neuropsychological test scores [3, 4, 5] and depressive symptom severity [5, 6]. **But the effectiveness of TPS-treatment is not conclusively confirmed. Therefore more studies are needed**. Further research is required to evaluate the effectiveness of TPS in AD and to assess the potential suitability of neurostimulation as an add-on therapy, complementing previous drug & non-drug approaches. Further research should concentrate on a longitudinal, multicenter study design with standardized study protocols, high sample sizes and control group & intervention group conditions.

AD is a severe illness that is associated with considerable burden and impairments for those affected as well as their caregiving environment. It can be assumed that the number of cases will continue to increase and that this will result in further burden for healthcare systems. Dementia is still associated with challenges in diagnosis and treatment. For these reasons, special attention should be paid to AD.

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