Transcranial Pulse Stimulation (TPS) in Alzheimer‘s: Long term retrospective group data and individual patient histories

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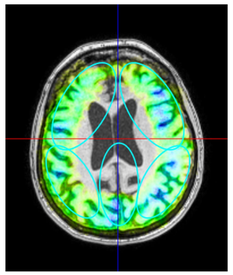
Background

Transcranial Pulse Stimulation (TPS) uses shockwaves for the treatment of Alzheimer´s patients. Recently, our group published short-term clinical results after the first treatment cycle (Cont et al. 2022). Long term data has not been reported yet.

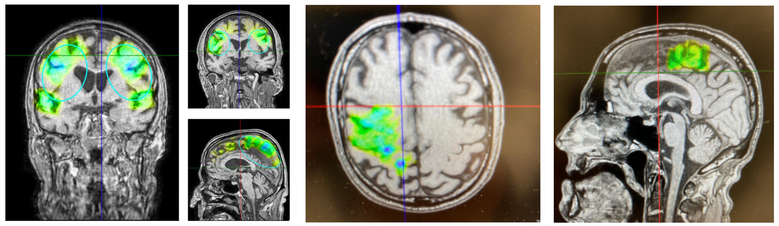
Methods

A consecutive series of 25 patients received TPS using the Neurolith System (Storz Medical). After the initial treatment cycle over 2 weeks patients were scheduled for monthly booster sessions. Safety data and different cognitive scores were assessed over 5-12 months. Individual symptomology, MRI- and CSF biomarker, disease stages, inclusion / exclusion criteria and treatment protocols were registered.

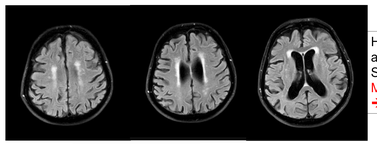


Results

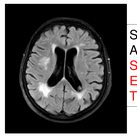
- Standard protocol was 6000 pulses with 4 Hz stimulation of precuneus, bilateral frontal and parietal cortex but was extended to bitemporal cortex and / or motor areas such as SMA, M1, PMC to treat concomitant tremor or hypokinesia.



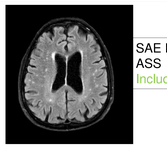
- The treatment was well tolerable with low number of only transient and not severe ADE even in selective patients with minor vascular lesions and platelet aggregation inhibitors.
(1.6% drowsiness, 0.8% nausea and headache, and 0.4% jaw pain and earache.)



History of TIA and aggressive behavior , SAE Fazekas 2, ASS
Multiple KI, EXCLUDED ➔ TMS



SAE Fazekas 3, ASS
SAE as KI EXCLUDED ➔ TMS



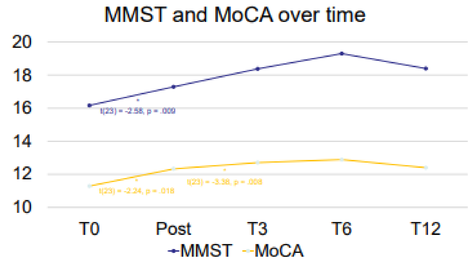
SAE Fazekas 1-2, ASS
Included for TPS

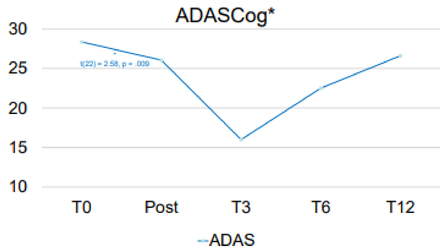
History PCA stroke, SAE Fazekas 1, ASS, Ginkgo
Included for TPS with sparing of occipital area and without Ginkgo

- Cognitive and affective scores improved significantly after the first treatment cycle regardless of symptom severity at baseline and CSF biomarker.

	n	M	SD	Df	T	P	Cohens d
MMST- T0	24	16.17	8.042	23	-2.58	.009*	.53
MMST-Post	24	17.29	7.123				
MoCA – T0	24	11.29	6.517	23	-2.24	.018*	.46
MoCA – Post	24	12.33	6.611				
ADAS – T0	23	28.35	13.217	22	2.58	.009*	.54
ADAS - Post	23	26.04	13.227				

- Preliminary long-term data showed stable effects over months with the selected booster interval.





Whereas the t-tests comparing T0 and post stimulation show a significant improvement, a Pearson correlation with MMST for the whole time span (T0, Post, T3, T6, T12) revealed no significant change, thus patients show stable performance (p = 3.21 with r = .057)

Discussion / Conclusion

The initial improvement of cognitive functions can be maintained up to 12 months in this retrospective.
Prospective controlled trials need to done as next step.
TPS might be an option for Alzheimer´s not only in mild cases and regardless of the biomarker constellation und thus maybe for other dementia types. Minor vascular pathology and platelet aggregation inhibitors is generally acceptable. Treatment protocols can extend standard patterns and include e.g. motor areas to address concomitant hypokinesia or tremor.

Ref.: Cont, C., Stute, N., Galli, A., Schulte, C., Logmin, K., Trenado, C. & Wojtecki, L. (2022). Retrospective real-world pilot data on transcranial pulse stimulation in mild to severe Alzheimer's patients. Frontiers in Neurology, 13, 948204. https://doi.org/10.3389/fneur.2022.948204