

International Journal of Neurology Sciences



ISSN Print: 2664-6161
ISSN Online: 2664-617X
Impact Factor: RJIF 5.42
IJNS 2023; 5(1): 29-30
www.neurologyjournal.in
Received: 14-01-2023
Accepted: 21-02-2023

Fani Tsolaki
Ph.D., Department of
Medicine, Faculty of Health
Sciences, Aristotle University
of Thessaloniki, Thessaloniki,
Greece

The role of remote ischemic preconditioning of the brain in the treatment of patients with mild Alzheimer disease

Fani Tsolaki

DOI: <https://doi.org/10.33545/26646161.2023.v5.i1a.12>

Abstract

Background: In the current paper we are presenting the results of a crossover study aiming at investigating the role of ischemic remote preconditioning in the cognitive status of patients with Alzheimer's disease and concurrent peripheral arteriopathy.

Methods: We recruited 10 patients with mild Alzheimer's disease and Rutherford stage 3 peripheral arteriopathy. After a thorough initial control, the patients were instructed and entered a standardized walking Programme for 2 months, followed by a Mini-Mental State Examination (MMSE) test. This was followed by a period of cessation of exercise also followed by a MMSE test.

Results/Conclusion: Remote ischemic postconditioning resulting after daily claudication appearance through two months structured exercise led to a very significant improvement in MMSE. Amelioration was not preserved when remote postconditioning was discontinued.

Keywords: Ischemic preconditioning, patients with mild, Alzheimer disease

Introduction

Alzheimer's disease and other forms of dementia consist a serious health problem affecting millions of patients around the world with a steadily growing incidence. Despite the intense research efforts, no definitive treatment has been found, with the already existing medications mainly targeting at decelerating the course of the disease. Ischemic conditioning has been investigated in various organs of the human body as a form of inducing resistance to the loss of blood/oxygen supply to the tissues^[1-2]. As all forms of dementia may also have an ischemic parameter, we performed this study in order to investigate the putative protective role of ischemic conditioning in the brain function of patients with mild Alzheimer's disease^[1-2].

Patients and methods

We studied 10 patients with mild Alzheimer's disease and concomitant peripheral arteriopathy causing intermittent claudication after structured aerobic exercise equal to or less than 200 meters of walking (Fontaine's stage IIb or Rutherford's category 3). The criterion of mild Alzheimer disease was a Mini-Mental State Examination score between 20 and 24^[3].

The patients were recruited and examined during the two-year period January 2020-December 2021. All individuals and close relatives were informed about the design and the purpose of the study and a related informed consent form was signed. The study was approved by the Ethical Committee of the "Greek Association of Alzheimer's Disease and Related Disorders" (Alzheimer Hellas) where the patients were recruited. The study was conducted in accordance with the Declaration of Helsinki, formulated by the World Medical Association.

Preliminary examinations

All patients were submitted to the following examinations: full medical history, brain MRI before initiation of the study, electroencephalogram before initiation of the study, carotid and peripheral ultrasonography before initiation of the study, Mini Mental State Examination

Corresponding Author:
Fani Tsolaki
Ph.D., Department of
Medicine, Faculty of Health
Sciences, Aristotle University
of Thessaloniki, Thessaloniki,
Greece

(MMSE) upon initiation of the study, MMSE after two months of walking exercise, MMSE two months after withdrawal of walking exercise.

Study design

The patients were instructed to enter a standardized walking exercise program at least five times a week (ideally on an everyday basis) for two months. They also were instructed to discontinue walking as soon as limb pain through ischemia occurred. After the two-month period they were submitted to MMSE testing. This was followed by two months of cessation of the aforementioned standardized walking exercise program. After the end of this period, a final MMSE test was performed.

Statistical analysis

Age (years), educational status (Years education), mental test scores were expressed as the mean \pm SEM. The two-tailed unpaired t-test was used to compare the values before and after the procedure as well as before and after the withdrawal of the procedure. Data passed normality test and differences between SEM (raw data) were due to random sampling. A difference was considered statistically significant if $p < 0.05$.

Results

The examined group consisted of 7 males and 3 females, with a mean age of 72.3 \pm 2.1 years. The years of education were 10.6 \pm 3.44, the basic MMSE score 22.5 \pm 0.97, the MMSE score after exercise 23.8 \pm 0.63, and the MMSE score after exercise withdrawal MMSE 23 \pm 0.94. The unpaired t- test two-tailed P value was 0.0023 (very significant) comparing basic and after exercise status and the two-tailed P value comparing basic and after withdrawal status was 0.2581 (non-significant).

Conclusions

Remote ischemic preconditioning resulting after daily claudication appearance through a two months' structured exercise led to a very significant improvement in the MMSE score. Amelioration was not preserved when remote preconditioning was discontinued.

Discussion

More than 2 months of physical activity (that was not experienced before) of people with lower limb arteriopathy, could lead to a collateral circulation development [4-5]. All participants of the survey expressed the opinion that exercise improved their quality of life. Alzheimer's disease is a progressive disease at different rates that cannot be predicted; during a long-lasting study some participants might deteriorate in terms of cognition. By the same reasoning, staying at the same stage of cognition 4 months after the ignition of the study, might mean benefit.

It is clear that modification of the study protocol is needed concerning the number of patients participating, the stage and kind of dementia (mild dementia or mild cognitive impairment), and a longer duration of the exercise program (Either duration of the exercise or withdrawal duration).

References

1. Voucharas C. Remote ischemic conditioning of the brain in dementia patients: protocol for a crossover non-

pharmaceutical intervention study. *Clin Trials Degener Dis.* 2019;4(4):89-93.

2. Wang Y, Meng R, Song H, *et al.* Remote ischemic conditioning may improve outcomes of patients with cerebral small-vessel disease. *Stroke.* 2017;48:3064-3072.
3. Arvanitakis Z, Shah RC, Bennett DA. Diagnosis and Management of Dementia: Review. *JAMA.* 2019;322(16):1589-1599.
4. Del Pozo Cruz B, Ahmadi M, Naismith SL, Stamatakis E. Association of Daily Step Count and Intensity With Incident Dementia in 78430 Adults Living in the UK. *JAMA Neurol.* 2022;79(10):1059-1063.
5. Eisenmenger LB, Peret A, Famakin BM, Spahic A, Roberts GS, Bockholt JH, *et al.* Vascular contributions to Alzheimer's disease. *Transl Res.* 2022;15:S1931-5244(22)00282-1.