New brain reperfusion rehabilitation therapy improves cognitive impairment in mild Alzheimer's disease: a prospective, controlled, open-label 12-month study with NIRS correlates.

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Background - A large body of evidence indicates that cerebral hypoperfusion is one of the earliest signs in the development of Alzheimer's disease (AD).

Objective - The aim of our study was to evaluate whether the brain reperfusion rehabilitation therapy (BRRT) would improve verbal memory and learning and/or global cognitive impairment in mild AD.

Methods - Using a prospective, controlled, open-label 12-month study, we enrolled 15 patients with mild AD, who underwent BRRT program (BRRT group), and 10 age–sex-matched mild AD patients, who received no treatment (control group). At baseline (T0), and at the end of the 3 months (T3), 6 months (T6) and 12 months (T12) participants from both groups were given an evaluation, using Mini-Mental State Examination (MMSE) and Rey Auditory Verbal Learning Test (RAVLT). In both groups by using near-infrared spectroscopy (NIRS), at T0 and T12, we measured tissue oxygen saturation (TOI) on temporal–parietal and frontal cortex of both sides. By means of NIRS, safe, repeatable and non-invasively technology, we measured TOI of the cortex microcirculation (Fig.1 and Fig. 2).

Results - Ten patients from the BRRT group and 10 from the control group completed the 12-month follow-up. At the end of rehabilitation protocol, a significant improvement of MMSE and RAVLT was observed in the BRRT group as compared to control group (Fig 3 A,B,C). At T12 compared to T0, a significant improvement of TOI on frontal cortex of both sides was observed in the BRRT group as compared to control group (Fig.4 A,B).

Conclusion - In conclusion, this pilot study provides preliminary evidence that BRRT improves verbal memory and learning and global cognitive impairment in mild AD which are associated with increased TOI values on frontal cortex of both sides. Additionally, BRRT seems to be well tolerated and, thus, might have a reliable application in the clinical management in mild AD patients.