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The application of Transcatheter Laser Revascularization for the restoration of cerebral microcirculation, tissue structure and the mitochondrial cellular apparatus in AD

Ivan V Maksimovich

Most Holy John Tobolsky, Russia

Background: AD treatment should be aimed at normalization of cellular metabolism, restoration of mitochondrial cellular structures, destruction and excretion of pathological proteins, which in turn requires the restoration and normalization of cerebral microcirculation. Here presented are the results of AD treatment based on angiogenesis stimulation, recovery of microcirculatory bed, and tissue and cell brain structures by means of transcatheter impact of low-energy laser.

Methods: From 93 patients with AD 48 patients aged 34-79 (average 65) were singled out, among which: *Group (TDR-0)* - 4 (8.33%) - pre-clinical AD stage without any particular cognitive impairment and dementia manifestations; *Group (TDR-1)* - 16 (33.33%) - AD history up to 2 years, mild dementia, mild cognitive impairment and mild manifestations of the disease (corresponds to CDR-1); *Group (TDR-2)* - 21 (43.75%) - AD history up to 6 years, moderate dementia, persistent cognitive impairment and more severe manifestations of the disease (corresponds to CDR-2); *Group (TDR-3)* - 7 (14.58%) - AD history of 7-12 years, severe dementia, severe cognitive impairment and late stages of the disease (corresponds to CDR-3). The examination included MMSE, CDR, TDR assessment, cerebral CT, MRI (with temporal lobes atrophy degree calculation and AD stages determination by «Tomography Dementia Rating scale» -TDR), SG, REG, and cerebral MUGA. Basic cerebral changes at AD were identified: temporal lobes atrophy, along with capillary blood flow reduction in the temporal and fronto-parietal regions, with simultaneous multiple arteriovenous shunts in the same regions, and early venous capillary blood dumping. Low-energy laser systems were used to carry out transcatheter treatment.

Result: Good angiographic outcome manifested in persistent angiogenesis, capillary blood flow restoration and arteriovenous shunts reduction, was obtained in all cases, which in turn led to amyloid beta metabolism normalization in the cerebral tissue. In the long period (2-6 years) all 48 patients showed 8-15% increase in the tissue mass of temporal lobes accompanied by dementia decrease and cognitive functions improvement, indicating recovery of cerebral structures.

Conclusions: Transcatheter laser revascularization leads to angiogenesis stimulation and to the recovery of microcirculation, cerebral cell and tissue structures, promotes the excretion of amyloid beta thereby decreasing the level of dementia and cognitive impairment during AD.

Biography

Ivan V Maksimovich, MD, PhD. ISTAART member, ESC member, EAPCI member, WSO member, ESO member, EPA member. Head Physician of Clinic of Cardiovascular Diseases named after Most Holy John Tobolsky (Moscow, Russia) since 1993. One of the major problems the clinic deals with is the diagnosis and treatment of various brain lesions including Alzheimer's disease. Over the past 20 years I have published over 200 scientific works on this subject.

carvasc@yandex.ru

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