

Therapeutic Use of Vitamin D, E and Omega-3 Fatty Acids in Delay Progression of Cognitive Dysfunction in Neuropsychiatric Systemic Lupus Erythematosus - Role of Brain Perfusion SPECT Study

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Systemic Lupus Erythematosus (SLE) is a disease of mysterious etiology with heterogeneous manifestations, including various neuropsychiatric (NP) expressions. Neurologic and psychiatric syndromes collectively mentioned to as neuropsychiatric systemic lupus erythematosus (NPSLE). Over the past few decades, as the durability of SLE patients has increased, NPSLE has been recognized as one of the important factors undesirably affecting of existence of SLE patients over the past 50 years. Recognizing nutritional factors that may improve intellectual dysfunction and help preserve higher-level cognitive capabilities has significant economic and public health welfares. Epidemiological studies within the general population have verified that vitamin D deficiency is a probable risk issue for cognitive impairment. It has also become recently deceptive that vitamin D deficiency pays to the disease activity and morbidity of SLE. Vitamin D levels, especially vitamin D deficiency, are linked with cognitive performance in adults. Vitamin D receptor VDR are express widely in the human adult brain specially in temporal, orbital, cingulated cortex and also in pyramidal neurons of the hippocampal region. The widespread expression of the receptor for vitamin D and enzymes responsible for its synthesis in the CNS, suggest that reduction in this hormone production may relevant for a number of neurodegenerative or psychiatric pathologies. Vitamin E is a potent antioxidant supportive the normal structure and function of cells by dropping damaging free radical reactive oxygen species (ROS). ROS have been concerned in tissue damage and an increase in pro-inflammatory cytokine production. These factors support the development of autoimmune and degenerative disease severity. One of the functions of Vitamin E is to act as a scrounger of the free radicals by working as an antioxidant. It recovers cognitive function and protect against the effects of brain ischemia and some of neurotoxins. As vitamin E is lipophilic, it can protect cell membrane and plasma lipoproteins from peroxy radicals, which react preferentially with the vitamin E. In particular, vitamin E is thought to inhibit the process of lipid peroxidation, which damages the polyunsaturated fatty acids essential to the integrity of cell membrane. Vitamin E's activity in shielding against the damaging effects of free radicals may be measured indirectly by evaluating the state of antioxidant –oxidant system. Omega-3 fatty acids commonly have an anti-inflammatory role, dropping the severity of autoimmune disease and increasing survival in mouse models of SLE. The evidence in human studies and clinical trials using omega-3 fatty acid in SLE patients is unsatisfying at this time, with multiple studies showing no noticeable effect on SLE disease activity index or other clinical scores and no consequence of omega-3 fatty acids on glucocorticoid necessities when used as immunosuppressive treatment.

While Vitamin D insufficiency is found to be associated with cognitive impairment in adults, the SLE itself is found to be associated with cognitive dysfunction (NPSLE) in about 39% [1] and with vitamin D insufficiency in about 16 - 95% affected adults. While the association of vitamin D insufficiency and NPSLE remains unknown, no reported data suggests that correction of vitamin D insufficiency can halt cognitive deterioration or facilitate cognitive improvement of NPSLE in adults. Omega-3 fatty acid dietary supplementation in patients

with lupus nephritis is found to have effect on inflammatory and atherosclerotic vascular phenomenon [2]. Furthermore, vitamin E can suppress autoantibody production via a mechanism independent of antioxidant activity in SLE [3].

Brain perfusion SPECT imaging is a functional nuclear imaging procedure accomplished to estimate regional cerebral perfusion. As cerebral blood flow is meticulously associated to neuronal activity, the activity distribution is supposed to reflect neuronal activity levels in different areas of the brain.

This kind of research effort requests to explore association of insufficiencies of vitamin D-3, Omega-3 fatty acid and vitamin E through quantitative assay in NPSLE patients and BRAIN SPECT perfusion scan and then the study shall continue to observe short term clinical outcome after a combined supplementation.

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