Multiple Sclerosis

Overview

Multiple sclerosis is a chronic, autoimmune disease of the central nervous system characterized by increased inflammation and degradation of the myelin sheath on neural axons.[1] The disease begins with a breakdown of the blood brain barrier and resultantly, an increased permeability of the brain to leukocytes and other immune cells from the rest of the body.2 Oligoclonal T lymphocytes and B lymphocytes are two major populations of cells that attack the myelin sheath coverings.3 The damage to the myelin sheath coverings results in a variety of symptoms including but not limited to weakness, muscle tingling, numbness, cognitive decline, and walking difficulties.4 There are four diagnosable varieties of multiple sclerosis: relapsing-remitting, secondary progressive, primary progressive, and progressive relapsing[5]. The etiology of all four types of multiple sclerosis remains unknown, but the disease appears more commonly in females[6] and individuals living at higher latitudes.[7] The relationship between latitude and multiple sclerosis appears to be related to relative exposure to ultraviolet radiation from the sun.[7] Current treatments include a variety of medications in combination with physical therapy. Acute relapse management medications include corticosteroids, like methylprednisolone, which reduce the severity and inflammation of relapses.[8] Disease-modifying drugs, such as interferon-beta,[9] glatiramer acetate,[10,11] and natalizumab,[12] effectively reduce relapse rates, inflammation, and slow disease progression. Current medications help improve the patients' overall health and quality of life, but their effects come alongside a wide variety of side effects. Side effects range in severity and vary depending on the medication. Corticosteroids can generate insomnia and increased blood pressure, while disease-modifying therapies can cause injection site inflammation,[13] liver damage,[14] and, in rare cases, a life-threatening infection of the brain known as progressive multifocal leukoencephalopathy (PML).[15]

Diet

A limited amount of research has been conducted on the diet's influence on multiple sclerosis, preliminary research, however, demonstrates that diet may be a valuable point of intervention for individuals suffering from multiple sclerosis, as it has been connected to the etiology[16] and progression[17,18] of the disease. Generally speaking, the Standard American Diet and the resultant increase in triglyceride[19] and LDL cholesterol levels,[20] are associated with a quicker progression of the disease. Contrastingly, the Mediterranean diet and consumption of fruits, vegetables, and fish, decreases the likelihood of developing multiple sclerosis.[21] In terms of dietary supplements, vitamin D_3 insufficiency[22,23] and decreased omega-3 fatty acid intake[22,24] are both well-established risk factors for multiple sclerosis development. Decreased vitamin D_3 consumption in mothers during pregnancy has even been associated with a higher risk of multiple sclerosis development in the fetus.[16] Supplementation of omega-3 fatty acids and vitamin D_3 has also shown effective in slowing the progression of the disease[25–27] in individuals already diagnosed. Vitamin D_3 and omega-3 fatty acid supplements may be safely taken simultaneously, and research even suggests that the combination of the supplements helps slow multiple sclerosis progression.[25] Vitamin D_3 supplements can be taken in the form of fish oil tablets, with 0.5g Docosahexaenoic acid (DHA) and 0.4g eicosapentaenoic acid (EPA,[18] while vitamin D_3 supplements can safely be consumed up to the upper limit of 4,000 IU.[28] Additionally, calcium and vitamin D_3 supplements may be helpful for patients taking corticosteroids, which can create an unhealthy reduction the body's absorption of calcium.[29]

Diet and dietary supplementation are great addition to current therapies but should not be considered a replacement for medications and physical therapy. Many studies have shown that dietary changes in conjunction with interferon beta[26,27] or glatiramer acetate[17,26] treatment significantly improve multiple sclerosis patients' disease progression.

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