Multiple Sclerosis

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Working at the health department as a public health investigator for COVID-19 has enabled me to learn more about different pre-existing medical conditions patients have been diagnosed with. About 3 patients out of the many different patients I interviewed weekly, confirmed diagnosis of an autoimmune disease known as Multiple Sclerosis or MS. After learning about MS, I was intrigued to conduct further research on it and synthesize that information into this assignment. Multiple sclerosis is a chronic autoimmune disease that affects the central nervous system which is composed of the brain and spinal cord. The immune system attacks the myelin sheathing which is composed of fatty substances and proteins and permits electrical impulses throughout the body to transmit signals along nerve cells quickly and effectively. MS tampers with myelin by damaging the insulation around the nerves resulting in slower or no impulses being transmitted, producing a lack of cell signaling. Nerve impulses are essential to the body because it stimulates the spinal cord and brain to react to brain signals associated with mobility, speech, memory, vision, bowel and bladder movement and many other bodily functions [1]. As MS attacks the nerve fibers and myelin protecting it, it causes inflammation and damage to nerve cells resulting in altered electrical messages in the brain.

About 90% of patients experience a relapsing-remitting course of MS in which symptoms such as fatigue, numbness, impaired vision, tingling throughout the body and weakness present for a few hours, days, or weeks (relapsing) but subsides after some time (remission). These patients may not experience symptoms again for weeks, months or years. Furthermore, there are three classifications of multiple sclerosis: primary-progressive MS, secondary-progressive MS, and benign MS. Primary-progressive MS is a gradual worsening condition from the start of the disease and is not very common. Approximately 10-15% of patients with MS have been diagnosed with primary-progressive MS and began experiencing gradual change in bodily

functions such as mobility, stiffness of muscles and other functions that may go unnoticed for some time. Secondary-progressive MS is diagnosed when doctors are unable to differentiate relapsing-remitting MS from the accumulation and worsening of the condition and the patient no longer experiences any remission. Benign MS is attributed to patients who have not had any symptoms after 15 years of being diagnosed with the disease and can only be diagnosed after 15 years [2] [3].

The direct cause of multiple sclerosis has not been confirmed as of yet, however, studies suggest that there may be several factors that play a role in this diagnosis. Environmental factors such as location around the world and vitamin D deficiency have been considered as a possible cause of MS. Other possible factors that have been considered include viral infections such as the Epstein Barr virus (EBV) and the human herpes virus type 6, smoking, genetic predisposition, and family history of MS. The risk of MS is higher in individuals who have genetic similarities with family members who have been diagnosed with this autoimmune disease. Finally, diet and malnutrition has also been suggested as a factor in patients suffering from MS [3] [4]. Signs and symptoms include but are not limited to: mobility challenges such as walking or running, loss of balance and coordination, tremors, weakness, uncontrollable bladder symptoms (urine leakage), constipation or weak stools, vision impairment, numbness, pain, tingling, memory loss, lack of good judgment and problem solving skills, slurred speech or inability to speak, and sexual incompetence. Symptoms can be physical and mental and can include depression and anxiety [5].

Diagnosis of MS is difficult as the symptoms resemble many other disorders but are typically discovered through evaluations and tests. Specifically, MRIs can be administered to suspecting MS patients and reveals scars or plaques along the brain and spinal cord indicative of

the immune cells attacking the nerve fibers. Cerebrospinal fluid can also be evaluated by a collection of the fluid and analyzed for immunological abnormalities that could derive from this disease. Finally, electrical impulse conduction can be measured throughout the body to determine if there is any damage in the central nervous system. As of this year, 2022, about 400,000 people in the United States have been diagnosed with multiple sclerosis and 2.5 million people worldwide [4]. It is more prevalent in individuals assigned female at birth possibly since body fat and obesity rates are higher amongst women, which is suspected to be a contributing factor to MS. MS can present itself anytime throughout a person's lifetime unless the patient has been diagnosed with Benign MS which presents no signs of infection physically and via an MRI.

Currently, there is no cure for MS and only treatments to deal with relapses and symptoms. For mild symptoms, steroids are typically prescribed to shorten the duration and severity of symptoms. These steroids are administered intravenous and are called glucocorticoids, the same used by professional athletes to reduce inflammation and strengthen the body. Other treatments fall under the preventative therapy category and consist of interferon beta injections which inhibits the immune white blood cells from responding to excessive neurological signals causing harm to the body and reducing inflammation. Another preventative therapy called Glatiramer acetate is a protein that is also given as an injection and signals the immune system to produce more anti-inflammation cells to reduce the inflammation MS causes. There are several other preventative therapies accessible to MS patients, however, the best method of managing MS is a combination of rehabilitation strategies, a good diet and consultation with many specialists such a psychiatrists, urologists, neurologist, and pain management specialists.

Bibliography

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