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Multiple Sclerosis
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What is Multiple Sclerosis?
Multiple Sclerosis (MS) is an inflammatory, chronic, auto-immune, neurological disease of the central nervous system (Reich et al., 2017). First discovered over 150 years ago, MS is one of the most common chronic inflammatory disease affecting the central nervous system (CNS) (Balto, 2015). Affected individuals may experience a wide range of neurological symptoms across the globe, with at least 400,000 cases affecting Americans (Reich, Lunn, & Calabresi, 2018). MS is characterized by recurrent attacks of inflammation in the CNS, resulting in demyelination and damage to access in the brain, spinal cord, and various nerves throughout the CNS, namely motoric systems. Female patients are more likely to be affected than their male counterparts (Reich et al., 2017).

Pathophysiology of MS
MS affects the gray and white matter of the CNS. It is a chronic and progressive auto-immune disease with no known cure at present (Herranz et al., 2017). Though there have been many treatments and medications to date, the development of MS, including obesity, smoking, sedentary lifestyle, high salt intake, and low vitamin D levels. Women make up approximately three times the number of males affected by MS. There also appears to be a correlation between the development of MS and the Epstein-Barr Virus (EBV), with almost all patients with MS having a history of EBV infection (Zotova et al., 2017).

The process in which demyelination occurs and plaque is formed is complex. The process involves activated T cells and immune cells that cause inflammation to occur through the wrong recognition of antigens from the myelin (Fard et al., 2015). This leads to the destruction of myelin sheaths, which are formed by the activities of the T cells. The communication between brain and body is affected, causing the messages to not be seen as normal or correctly or effectively. The damaged myelin is then replaced with scar tissue which can form plaques, further damaging nerve conduction (Balto & Rumrill, 2015).

Significance of Pathophysiology
Though somewhat understood how MS occurs through the destruction of myelin and subsequent plaque formation and loss of function, there is still much to be understood about what MS affects, when, and why, especially in regards to how the disease progresses in each individual. It is unknown whether MS has a multitude of causes or one specific trigger for development, though most research points to environmental factors such as EBV as a potential cause (Balto & Rumrill, 2015). There have been more than 200 gene variations that increase the risk of MS, and two to four percent risk for development in those with a first degree relative with MS (Balto & Rumrill, 2015).

As a progressive disease, relapse and exacerbations are common throughout the chronic disease course. Whether lesions will continue to grow and form into plaques, or how fast it will occur is not well understood (Reich et al., 2018). During an MS relapse, demyelination and axonal transaction can and do occur, which can lead to permanent disability. Further demyelination leads to increased lesions in number or size, and subsequent greater amounts of plaques formation, further progressing the neurologic dysfunction (Sotaniemi et al., 2016).

Prognosis of MS is largely related to the frequency of relapses. The higher the relapse occurrence in the first five years, and the areas of involvement, such as the spine or brain stem, are indicators of a poorer prognosis than those with few relapses (Sotaniemi, 2016).

There are four major types of MS that can help to classify and predict the clinical course of MS. The most common is relapsing-remitting (RRMS), which affects roughly 85% of newly diagnosed individuals. RRMS can progress to secondary-progressive (SPMS). In RRMS, exacerbations of disease activity persist in the absence of new lesions (5% of MS cases). Secondary-progressive (SPMS) is more common in RRMS patients, and exacerbation frequency may remain the same or increase. In SPMS, the demyelination process is progressive with few relapses (Visaria et al., 2016).

Diagnosis
A diagnosis of MS can be made in one way or two. The first, while rarely done, is through directly sampling the CNS tissue through a biopsy. The CNS tissue involves two layers that can aid in the diagnosis and prognosis of MS. The most commonly utilized, and most reliable for diagnosis of MS is through magnetic resonance imaging (MRI). With an MRI, the diagnostic team can see the entity of the CNS and visualize any demyelination (Reich et al., 2018).

Nursing Implications
As a chronic, progressive, neurologic disease, the role of the nurse in very important is disease management and education, and support. Though there are many, there are 15 approved medications for disease management. In 2017 (Reich et al., 2018). The role of the nurse in disease management is seen by educating the patient on the importance of taking the disease-modifying therapy (DMT) as prescribed when signs or symptoms may not be present, or when the patient does not feel any improvement. The first line of DMTs are usually prescribed long-term and can have a low side effect, leading to further dysfunction development (Visaria et al., 2018).

At-risk patients also need the support of nurses throughout the course of their disease. As a disease primarily being diagnosed in early adulthood, is considered to be the most productive years of life, patients may feel uncertainty and fear regarding their diagnosis. They may feel as though they are losing control or they may lose control of bladder and bowel. Their dignity is hurt through the disease process, but the nurse is able to support the patient through active listening, reassurance, and the ability to answer any questions the patient may have.

Conclusion
In conclusion, to MS is a chronic, autoimmune, inflammatory disease of the CNS that leads to neurological dysfunction. The disease involves activated T cells wrongly attacking and destroying the myelin sheaths of neurons which aid in the conduction of signals between brain and body. Damaged myelin is replaced with scar tissue which can form plaques, further damaging the routes of communication between brain and body. This process leads to the development of neurologic dysfunction of the affected nerves. Primary affected females in the early to middle adulthood, the disease’s progression is related to the number of relapses and brain tissue damage. There is no single cause has yet been identified in MS, but risk factors include gender, ethnicity, tobacco abuse, low vitamin D levels, as well as over 200 genetic variants that can increase the risk of development. There is currently no cure, but treatment is based on disease modification and maintenance, and the prevention of new lesions.

References