Multiple Sclerosis

overview

Multiple sclerosis (MS), also known as encephalomyelitis disseminate, is a potentially disabling neurodegenerative disease. In MS, the immune system attacks the protective sheath (myelin) that covers nerve fibers and causes communication problems between your brain and the rest of your body. Eventually, the disease can cause permanent damage or deterioration of the nerves.

Signs and symptoms of MS vary widely and depend on the amount of nerve damage and which nerves are affected. Specific symptoms can include double vision, blindness in one eye, muscle weakness and trouble with sensation or coordination.

- **Pathophysiology**

MS involves the loss of oligodendrocytes, the cells responsible for creating and maintaining a fatty layer—known as the myelin sheath—which helps the neurons carry electrical signals. This results in a thinning or complete loss of myelin and, as the disease advances, the breakdown of the axons of neurons.

Apart from demyelination, the other sign of the disease is inflammation. T cells gain entry into the brain via disruptions in the blood–brain barrier. The T cells recognize myelin as foreign and attack it. The attack on myelin starts inflammatory processes, which triggers other immune cells and the release of soluble factors like cytokines and antibodies. When the immune system stops the attack, the myelin is able to regrow and resume its function. Remyelination does not always occur however and, when it does occur, it is never as good as if there had never been damage in the first place. Over time, with repeated episodes of demyelination, the nerve is unable to remyelinate and the nerve eventually dies.

- **Treatment**

Steroids are mainly used for treating acute episodes of MS. Steroids available for the treatment of MS include: prednisone, prednisolone, methylprednisolone, betamethasone, dexamethasone.

Disease modifying drugs (DMDs) can decrease the frequency and severity of acute attacks, delay the progression of MS, and slow down the progression of disease related disability and cognitive decline. Interferon beta-1, is a naturally occurring protein found in the body. It is thought to inhibit the expression of chemicals that trigger the autoimmune response which causes inflammation and neurodegeneration associated with MS.

Natalizumab is a humanized monoclonal antibody and is an alpha-4 integrin antagonist or blocker. It binds to integrins expressed on the surface of white blood cells (except neutrophils) and inhibits adhesion of the white blood cells to their

receptors. Natalizumab is thought to exert its benefits in MS by preventing migration of white blood cells into the brain and spinal cord.
As of 2017, rituximab has been widely used off-label to treat progressive primary MS.

References

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