Understanding What MS Brain Lesions Are

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What Are MS Brain Lesions?

When you were told that you had multiple sclerosis (MS), you were probably told that you had lesions on your brain. You perhaps thought, “What? What the heck is a lesion?”

It can be a bit confusing because there are various types of brain lesions. For example, you can have an abscess on your brain that is caused by infection, and this type of lesion is life-threatening.

An arteriovenous malformation (AVM) is when the arteries and veins of the brain basically twist together; the vessels are much more fragile and can leak blood into the brain. In addition, these vessels may not pump blood as efficiently, causing seizures.

Then, there are cerebrovascular infarctions – strokes – when clusters of cells die. Next, brain tumors, both malignant and benign, are also considered lesions. Lastly, cerebral palsy is even considered a brain lesion – this type of lesion occurs in utero, does not progress over time and can affect movement as well as communication skills.

So, finding a lesion on the brain that is diagnostic for MS can be a bit confusing. Let’s explain it a little bit, shall we?

What Can Cause Lesions on the Brain?

MS is a disease that affects the central nervous system (CNS); specifically, it is an autoimmune disease that attacks the myelin (the protective sheath that covers the nerve fibers). Because it attacks the myelin, it ends up destroying the nerve's ability to communicate, eventually causing the nerves to deteriorate and/or become permanently damaged.

Continued damage to the myelin basically causes scarring of the brain, and this scarring causes lesions to form on the brains surface. These lesions are what is seen on imaging, such as MRIs.

What Parts of the Brain Are Affected by MS Lesions?

MS lesions can occur anywhere on the brain. However, they are most likely to occur on the optic nerve, the spinal cord and the cerebellum.

It is also important to note that symptoms are highly specific to each person – although patient A and patient B may have lesions in the same areas, each may have different symptoms. Lesions are unpredictable.

The Structure of Nerves

The nervous system is comprised of two parts. The brain and spinal cord make up the central nervous system. Nerves that go to and from the rest of the body comprise the peripheral nervous system.

The nervous system contains two types of cells. They are called neurons and neuroglia. Both have a role in the formation of lesions.

A neuron is composed of three main parts: the axon, dendrites and cell body. It is believed that damaged neurons cannot regenerate. If they are damaged, the injury is permanent.

Axons are the portions of nerves that are directly damaged by lesions. The axon portion of a neuron may be microscopic or over a yard long — it depends on the specific nerve. Neurons carry messages between nerves or organs.

Neuroglial cells provide nourishment and protection to neurons. These cells are sometimes referred to as glial cells. They support the neurons and indirectly aid the transmission of messages.

Specialized kinds of neuroglia protect the nerves of the peripheral nervous system. The fatty myelin sheath contains the neuroglia, which can regenerate. They may be repaired; however, the tissue regeneration process may be slow, impeded by scar formation in the peripheral nervous system.

When MS occurs, the myelin sheath is weak and scarred by lesions, and its protective effects do not function adequately. Damage to neurons result and symptoms of MS appear.

There are areas along the axons of nerves called nodes of Ranvier that speed up the transmission of messages along the nerve. These are the areas where lesions develop.

How MS Brain Lesions Are Formed

It is believed that an inflammatory process, possibly provoked by an infection or another insult to the body, is the precipitating process which leads to MS. A complex immune response to the threat ensues.

White blood cells that typically protect the body damage the nerve cells. The normally protective mechanism that guards the central nervous system from injury does not function correctly. As a result, the nervous system is damaged.

The cells that make up the myelin sheath are impaired, and plaques develop where the myelin sheath is weak or absent. The plaques form in diverse regions of the central nervous system. Scarring and nerve injury occurs.

The Effects of Nerve Damage

When MS is in its early stages, the myelin sheaths are damaged, but the axons of the neurons are not immediately injured. Numbness, weakness or other transient symptoms may occur.

However, the symptoms often come and go as the neuroglial cells regenerate and heal. Periods of disease remission occur.

As the illness worsens, the myelin sheath no longer regenerates. Scar tissue and lesions develop in the place of the myelin sheath. The unprotected neurons become permanently damaged. Messages between nerves and tissues of the body slow and may become completely disrupted. Permanent symptoms and loss of function may result.

The process is intensified if there are multiple lesions in many parts of the nervous system. The intensity of the disease and the rapidity of its progress varies greatly between different people with MS.

Lesions may be visible with an MRI. Plaques may be forming even when the illness appears to be in remission.

Research has shown that 5 to 10 new brain lesions form for everyone that causes symptoms. Symptoms occur due to damage within the brain, spinal cord or optic nerves.

Preventing and Limiting Plaque Formation

Newer medications have been developed in recent decades that reduce plaque formation. The positive effects of these medications have been shown on MRIs as well as by patient's reductions in symptoms and the slowing of disease progression.

Specialized diets low in animal protein and fats are hailed by some sufferers as effective.

Many people use omega-3 fatty acid supplements as an aid to protect against inflammation and plaque formation. Some studies indicate that plant-based omega-3-rich oils provide protective benefits. These include flax, borage and evening primrose seed oils.

More studies support the use of fish oil. Fish oil containing a total of 1.8 grams of EPA and 1 gram of DHA taken in divided doses each day is recommended.

The use of sunflower and olive oils may be beneficial as some studies have indicated that including these omega-6 fatty acid rich oils reduces symptoms. Evening primrose oil is another source of omega-6 fatty acids; however, it is expensive. The volume of evening primrose oil needed to obtain results is very costly.

The herb, gingko biloba may help to protect nerves from damage. It also preserves mental functioning. 40 to 80 milligrams of gingko that has been standardized to contain 24% gingko flavonol glycosides and 6% terpene lactones is recommended by leading naturopathic physicians.

If you have MS, check with your healthcare provider as new information and treatments are becoming available to prevent the formation of lesions and disease progression.

What is the Prognosis of MS?

The prognosis of people with MS has increased considerably over the past 25 years. According to the National MS Society, people with MS can expect to live approximately seven years fewer than people who do not suffer from MS. However, they typically pass away from complications of their disease rather than as a direct result of their disease. For example, they may die from cardiovascular disease. It is rare that someone has MS that progresses so rapidly that it is fatal.

That being said, the progression of MS is highly variable, meaning that it affects each person differently. One person may progress much more rapidly through their disease state compared to another person.

Other factors affect life expectancy to consider. Having a family history of MS, smoking cigarettes and lacking vitamin D exposure all can make MS progress more rapidly. People who have progressive forms of MS also tend to progress more quickly than those with relapsing-remitting MS, as do African Americans with MS.

So, what has improved the life expectancy over the past 20 to 25 years? Well, there have been two large factors that contribute to the improved life expectancy: better availability of treatments and people making lifestyle changes.

There are now more disease-modifying therapies on the market, meaning that people with MS have options when it comes to their treatment. If one medication does not work, there is more than likely another one that will.

Also, there has been plenty of research that indicates that reducing certain habits, like smoking and drinking alcohol, and getting exercise and more sleep, can curtail some symptoms, even though these habits are not curative.