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## Relapsing Forms of Multiple Sclerosis: How It Impacts Patient Symptoms

### Announcer Introduction:

Welcome to ReachMD. This medical industry feature, titled “Relapsing Forms of Multiple Sclerosis: How It Impacts Patient Symptoms”, is sponsored by Novartis Pharmaceuticals Corporation. This program is intended for health care professionals. Here's your host.

In this audio recording we will discuss the neuroinflammation that occurs in the brain and spinal cord in early multiple sclerosis, or MS, and examine 4 systems that are commonly affected—the sensory system, visual system, bladder, and musculoskeletal system.

### Early Inflammation

Early inflammation in MS can disrupt the blood-brain barrier that normally protects the brain from damaging pathogens.<sup>1</sup> This leakage of the blood-brain barrier allows autoreactive immune cells to enter the central nervous system, or CNS, from the peripheral body.<sup>1</sup>

Specifically, autoreactive T cells can release proinflammatory cytokines and promote the breakdown of the blood-brain barrier inside the CNS.<sup>1</sup>

Healthcare professionals previously believed that the onset of disease activity in MS was primarily mediated by pathological T cell activity. However, recent research implicates a key role for autoreactive B cells in the initiation of this process.<sup>2</sup>

So, in MS, autoreactive B-cell activity promotes neuroinflammation by activating lymphocytes through either directly or indirectly releasing proinflammatory cytokines or antibodies. Autoreactive B-cell activity and its role in neuroinflammation has been noted in several pathways in MS.<sup>2,3</sup>

In the first pathway, B cells that cross the blood-brain barrier can transform into antigen-presenting cells, where they can bind with autoreactive CD4+ T cells within the CNS. This activates the T cells to release proinflammatory cytokines, which can disrupt oligodendrocyte activity and cause damage to the myelin sheath.<sup>2-4</sup>

In the second pathway, autoreactive B cells inside the CNS can release proinflammatory cytokines directly, causing damage to myelin and other CNS components.<sup>2,3</sup>

And finally, in the third pathway, B cells that have transformed into antibody-producing plasma cells can release autoantibodies that promote axonal damage and complement-mediated demyelination through antigen-binding activity.<sup>5,6</sup>

B-cell depletion in MS is regulated through antibody-triggered apoptosis,<sup>7</sup> complement-dependent cytotoxicity,<sup>8</sup> and antibody-dependent cellular cytotoxicity.<sup>9</sup>

Now, let's discuss 4 systems commonly involved in the early stages of MS.

### Systems Affected in MS

The most common early symptoms in MS include sensory impairments, such as numbness, neuropathic pain, temperature changes, and other abnormal sensations, typically reported in the limbs and extremities.<sup>10, 11</sup> Within the first year of diagnosis, up to 82% of MS patients reported sensory impairments.<sup>12</sup>

Vision problems are another common early symptom in MS, and are reported by more than 50% of patients within the first 2 years of

diagnosis.<sup>12</sup> Inflammation can cause optic neuritis which can disrupt signal propagation along the optic nerve, leading to these symptoms.<sup>13</sup>

Damage caused by neuroinflammation can also be associated with musculoskeletal symptoms. Spasticity—the feeling of tightness or stiffness in muscles or the inability to fully control muscles—is reported in almost 70% of patients with MS within the first 3 years of diagnosis.<sup>12,14</sup>

Lastly, bowel and bladder symptoms are another common symptom in early MS, reported by almost 50% of patients within the first 2 years of diagnosis.<sup>12</sup> Symptoms such as a feeling of urgency or urinary incontinence likely reflect impaired signaling of the corticospinal tracts.<sup>15</sup>

Although we have focused on 4 body systems often affected in early MS, it is important to note that symptoms can impact nearly every neurologic domain. Early identification of MS patients in clinical practice should seek to measure the extent of impairment across multiple domains—psychological, cognitive, visual, sensory, autonomic, fatigue, and motor.<sup>12</sup> Developing a better understanding of the early subtle symptoms can improve early identification of MS and ensure patients receive the clinical care they need.

Thank you for listening to the Novartis Early MS & Impact on Patient Symptoms audio recording.

Announcer Close:

This program was sponsored by Novartis Pharmaceuticals Corporation. If you missed any part of this discussion, visit [reach-m-d-dot-com/industry-feature](https://reach-m-d-dot-com/industry-feature). This is ReachMD. Be part of the knowledge.

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