Multiple Sclerosis Media Fact Sheet

What is Multiple Sclerosis (MS)?

While its exact cause is unknown, MS is an autoimmune disease of the central nervous system (CNS) – made up of the brain and spinal cord. As with other autoimmune diseases, in MS the body turns against itself by mistaking normal cells for intruders. Our current understanding of the MS disease process suggests that T cells, a key component of the immune system, play an important role in MS by attacking the myelin in the CNS.

Myelin is a fatty layer, or sheath, that surrounds and protects nerve fibers in the CNS that are responsible for transmitting signals to other parts of the body. Myelin speeds up the communication between the brain and other parts of the body. If it is damaged or destroyed, the nerve impulses get slower or do not transmit at all.

The result of (repeated) immune attacks and the subsequent loss of myelin over time leave patches of scar tissue called sclerosis. On Magnetic Resonance Imaging (MRI), a technique commonly used in the diagnosis of MS, a region showing destroyed myelin is called a lesion or inflammatory plaque. These lesions help identify areas of the brain and spinal cord where there may be a block or slowing of nerve impulses, producing MS symptoms of various kinds and severity.

In addition, inflammation occurs in the CNS as part of the disease process. As a result, patients may experience relapses, an immediate worsening of neurological function (physical or mental) which lasts for more than 24 hours. MS can cause a range of physical and mental problems including loss of muscle control and strength, vision, balance, sensation and mental function[1]. Over time, with repeated attacks, damage accumulates leading to permanent nerve damage and loss of neurological function, and an accumulation of disability.

How common is MS?

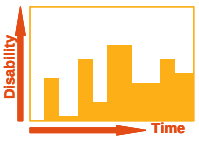
- Up to 2.5 million people worldwide are affected by MS[2], a neurodegenerative condition that often begins in early adulthood (between the ages of 20 and 40). Women are twice as likely to develop MS as men[3,4].
- The incidence of MS varies geographically, with a higher incidence in temperate zones and lower incidence in equatorial zones. In Europe, the incidence of MS steadily increases from south to north[1].

What are the symptoms of MS?

- MS symptoms are unpredictable and vary from person to person[5].
- MS can affect all functions of the brain, including movement, vision and sexual function. Over the course of the disease, some symptoms may be temporary while others can be more lasting[5].
- Frequent symptoms include[5].
    - Fatigue, one of the most common symptoms, can seriously interfere with a person's ability to function productively.
    - Numbness affecting the face, body and limbs.
    - Sexual problems that can affect arousal and orgasm.
    - Balance problems that can stem from dizziness or vertigo.
    - Spasticity can vary from mild muscle tightness to painful, uncontrollable spasms of the arms and legs.
    - Chronic pain affects more than half of people with MS.
    - Depression is common among people with MS.
    - Incontinence affects the majority of people with MS.
    - Difficulty in walking limits mobility and frequently leads to a need for assistance, including wheelchair use.

What are the types of MS?

Relapsing-Remitting MS (RRMS) is a form of MS characterized by attacks or relapses with worsening neurological function, followed by periods of remission where they partially or fully recover, during which the disease remains stable. Approximately 80% of people with MS have this form of the disease at onset[3].



Secondary-Progressive MS (SPMS) is characterized by gradual worsening of neurologic function (accumulation of permanent disability) between relapses. Before disease modifying therapies (DMTs), a majority of people with RRMS developed SPMS within 10 years of their initial diagnosis but long-term data are not yet available to determine if treatment significantly delays this transition[6].

Primary-Progressive MS (PPMS) affects about 10% of people with MS. It follows a steady course of worsening neurologic function. People with this form of MS do not experience relapses or remissions[7].

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What is the impact of MS?

MS significantly impairs the quality of life of the individual and their families[8-11]. People with MS experience a lower quality of life on average than those with other chronic diseases such as diabetes and epilepsy[12].

Nearly 85% of people with MS are affected by fatigue regardless of their disability or clinical course, which interferes with their quality of life and productivity[13]. About 50% of people with MS need a wheelchair within 20 years of developing MS[12].

MS leads to relapses, demyelination and axonal loss resulting in neural damage and progressive disability, causing considerable patient burden[12-13].

MS is also associated with a substantial economic burden. Studies in several European countries have reported annual costs equivalent to about €30,000-40,000 per patient. These costs include[14]:

- Direct medical costs, including disease-modifying drugs, in-patient and ambulatory care, and treatment of MS symptoms
- Direct non-medical costs, such as durable medical equipment and services
- Indirect costs such as costs of lost productivity by patients and carers

How is MS diagnosed?

There is no single test that confirms a clinical diagnosis of MS. In general, doctors diagnose MS by evaluating patients in whom typical symptoms of MS occur together with results of imaging data of the brain and other measurements, such as cerebrospinal fluid evaluation. The aim is to see whether the episodes could be due to MS or to another disorder affecting the CNS. The diagnosis of MS is based on:

- Episodes of neurological symptoms and signs that are consistent with an MS attack (relapse). These episodes last for at least 24 hours and resolve, partially or completely, over days to weeks, with the period of improvement lasting for at least one month.
- MRI of the brain and spinal cord can detect inflammation and scarring in the CNS caused by MS.
- Cerebrospinal fluid (CSF, the liquid surrounding the brain and spinal cord) is collected and tested for markers typical of MS in order to support the diagnosis).
- Evoked potential (EP) tests measure conduction speed of nerve tracts in the CNS and may be helpful in determining the presence of demyelinating lesions, even in the absence of neurological symptoms. Since the advent of MRI, EPs are less frequently used for diagnostic purposes.

How is MS treated?

MS can be treated in different ways according to the individual's status. Drugs that affect the course of the disease, so-called Disease-Modifying Therapies (DMTs) are approved for the prevention of relapses and reducing the rate of accumulating disability. These treatments attempt to alter the natural course of MS by modifying the immune response, so reducing inflammatory activity in the brain. Injectable, first-line conventional DMTs offer modest efficacy for patients[15] leaving an unmet need for treatments with greater efficacy and convenience.

In addition, there are therapies available to treat individual MS symptoms, such as spasticity, tremor, bladder and bowel dysfunction, pain, cognitive dysfunction, vertigo, nausea, vomiting and fatigue. Additionally, corticosteroids are used for the acute treatment of relapses, but are not recommended for an extended period of time. Taken orally or by injection, corticosteroids reduce inflammation by suppressing the immune system and may reduce the severity and duration of an attack.

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