

Multiple sclerosis (ms): epidemiology, genetics and causes



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Intro

Multiple Sclerosis (MS) is a neurological disease that affects the brain and spinal cord. This occurs because of damage to the outer layer of nerve called the myelin sheath. An autoimmune response occurs, and the body attacks part of the nerve called the myelin sheath, “ immune cells, which normally defend the body against bacteria and viruses, mistakenly attack the myelin sheath, stripping it away and exposing the nerve fibers underneath” (“ Myelin: An Overview”, 2015). Nerves are little communication sources directed by the brain that tell muscles what to do. Once the damage occurs from MS miscommunication between the brain and muscles occur (“ Myelin: An Overview”, 2015). Nerves are not controlled properly by the brain and symptoms can be different from person to person (“ Myelin: An Overview”, 2015). The full spectrum of the disease multiple sclerosis is still not completely understood. However, over the last few centuries physicians and experts have learned a lot when it comes to: history, epidemiology, diagnosis, abnormal pathophysiology caused by the disease, treatment, effects on other organs, the different stages of the disease, and the role genetics play.

History

Due to the difficult nature of identifying and diagnosing multiple sclerosis wasn't given a name until 1868 (“ History of Multiple Sclerosis”). Jean-Martin Charcot was the neurologist to do this in and he is often called “ the father of neurology” (“ The History of Multiple Sclerosis”, 2016). This physician kept close detail of the patient's symptoms and signs of the disorder (“ The

History of Multiple Sclerosis”, 2016). Experts today can look back at his notes and confirm Charcot’s diagnosis of MS. Charcot’s early attempts to treat MS were unsuccessful. Examples of therapies tried were: deadly nightshade, arsenic, mercury, and injection of malaria parasites (“ History of Multiple Sclerosis”). Charcot was frustrated due to the inability to cure the disease (“ The History of Multiple Sclerosis”, 2016). Once he examined the deceased patients brain he noticed the scars on it from MS (“ The History of Multiple Sclerosis”, 2016). In the 19th century physicians around the world recognized MS as a disease, “ MS was recognized in the England by Dr. Walter Moxon in 1873, and in the United States by Dr. Edward Seguin in 1878” (“ The History of Multiple Sclerosis”, 2016). The knowledge of MS grew vast at the end of the century. Physicians were able to recognize common traits of MS like age and heredity or the neurological symptoms people experience (“ The History of Multiple Sclerosis”, 2016). Throughout the years physicians and other experts have learned more about MS because the expansion of knowledge in bacteria, viruses, and diseases in general (“ The History of Multiple Sclerosis”, 2016). This makes a lot of sense because over time resources and technology have also developed as useful tools in the expansion in knowledge of MS. Key components of understanding MS biologically were discovered like myelin in 1878 and the cells that make up myelin in 1928 (“ The History of Multiple Sclerosis”, 2016). Spinal fluid abnormalities that help physician’s diagnosis patients with MS were discovered in 1919(“ The History of Multiple Sclerosis”, 2016). In 1951, the first therapy was found to reduce the harshness of relapses; as well as, shortening them was cortisone (“ History of Multiple Sclerosis”).

Epidemiology

There has been a lot of data collected comparing types of individuals who have or get MS more frequently. Factors like gender, age, race, and hereditary all are risk factors to developing the disease. Young adult females are more likely get the disease, “ Multiple sclerosis favors women over men by a ratio of nearly 2 to 1 and strikes most often between the ages of 20 and 40” (Rolak, 2003, p. 57). There is also a trend of Caucasians who live in northern European countries developing MS (Rolak, 2003, p. 57). If a family member has the disease it may put others at risk in that family as well, “...MS tends to cluster slightly within families, as there is a 1 to 5% risk of developing MS if a parent or sibling has the disease, and at least 25% concordance among monozygotic” (Rolak, 2003, p. 57).

Genetics

Multiple Sclerosis is not an inherited disease. This means the disease itself is not passed on to future generations; however, factors that possibly puts individuals at risk are (“ What Causes MS?”). The National Multiple Sclerosis Society discusses peoples risk of developing the disease, “ In the general population, the risk of developing MS is about 750- 1000 people” (“ What Causes MS?”). If a relative in the imitate family has MS it can put that individual at higher risk and having an identical twin with MS can make this risk even greater (“ What Causes MS?”). There are about 200 genes who have been identified that they each may be a small contributing factor (“ What Causes MS?”). According to the genetic home reference about MS from U. S National Library of Medicine HLA-DRB1 and IL7R are two genes linked to

MS when there are gene abnormalities (“ Multiple sclerosis - Genetics Home Reference - NIH”, 2019). The family of HLA-DrB1 is called the human leukocyte antigen (HLS) complex. This group helps the body differentiate proteins made an individual’s own body and external intruders (“ Multiple sclerosis - Genetics Home Reference - NIH”, 2019). The IL7R gene has a special role in the immune system, “... provides instructions for making one piece of two different receptor proteins: the interleukin 7 (IL-7) receptor and the thymic lymphopietin (TSLP) receptor” (“ Multiple sclerosis - Genetics Home Reference - NIH”, 2019). The two different receptors live in the cell membrane and there signaling pathways encourage development and existence of immune cells (“ Multiple sclerosis - Genetics Home Reference - NIH”, 2019). A patient with MS has the gene IL7R (IL-7) receptor living inside the cell instead of the cell membrane. Both of the genes affect the immune system, so any variance in the genes could potentially set off an autoimmune response. (“ Multiple sclerosis - Genetics Home Reference - NIH”, 2019). The symptoms related to MS are caused by an autoimmune response that damages the protective layer of a nerve called the myelin sheath.

Paragraph 4: Cool Discoveries

Environmental Factors

While researching multiple sclerosis I was surprised to see possible environmental factors that could put one at risk of developing MS. I had no previous knowledge of what could possibly put one at risk to developing MS besides abnormalities in one’s genes. Some of the possible environmental

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risk factors include low vitamin D levels, smoking, and obesity. A lot of articles and websites discussed the types of people at greater risk of developing MS. There is evidence proposing individuals who live closer to the equator that have more sun exposure and higher Vitamin D levels are at lower risk of developing MS (“ What Causes MS?”). The belief behind this is that higher levels promote healthier immune function. This may protect people living in higher sun exposer areas from the autoimmune responses MS has (“ What Causes MS?”). Other studies suggest individuals who suffer from MS could benefit from vitamin D. Increasing the vitamin level could possibly lessen the occurrence and harshness of symptoms; as well as, lengthening the time between relapsing- remitting MS and secondary- progressive MS (Collazo, 2019). The authors from the article, “ Vitamin D and Multiple Sclerosis: A Comprehensive Review” mention there is a correlation between people who have low vitamin D levels and MS; however, others that suffer from MS with low levels may benefit from taking vitamin D supplements (Sintzel, Rametta, & Reder, 2017, p. 81). Smoking not only increases a person’s risk of developing MS but it can also make the progression of MS happen faster (“ What Causes MS?”).

Paragraph 5: Normal/abnormal patho phys of tissue/ structures

Diagnosis/test ordered

Multiple Sclerosis (MS) can be challenging to diagnose. This occurs because there is not specific test to tell physicians if patient has MS like other diseases. A lot of symptoms of MS are also signs for other diseases and disorders making it even more difficult to diagnosis. Different test and

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imaging must occur as well as differential diagnosing before a physician can make diagnosis of MS. A physician will get all the patient's history of " any past or present symptoms that might be caused by MS" (" Diagnosing MS"). The health care professional will also look at environmental factors, family history, birth place and places traveled (" Diagnosing MS"). This information may give the doctor clues on other diseases or disorder causing the symptoms. They also look for patterns in reoccurring of symptoms, possible remissions, or flare ups that may suggest MS. Next, a physician will perform a neurological exam, " which includes test of cranial nerves (vision, hearing, facial sensation, strength, swallowing), sensation, reflexes, coordination, walking and balance" (" Diagnosing MS"). A neurological exam usually provides enough evidence to make a diagnosis, but other test is used to confirm a diagnosis of MS (" Diagnosing MS"). Blood test are usually where most physicians start after medical history to help rule out other diseases. There are specific biomarkers associated with MS that blood test can check for (" Multiple Sclerosis", 2019). Abnormal antibodies can also be linked to MS (" Multiple Sclerosis", 2019). Physicians may order a lumbar puncture where they remove a small amount of spinal fluid from the spinal canal (" Multiple Sclerosis", 2019). The laboratory will test the fluid for related antibodies; as well as, ruling out other infections or conditions with similar symptoms (" Multiple Sclerosis", 2019). In the active phase of MS, lesions can appear on the brain or spinal cord (" Multiple Sclerosis", 2019). A magnetic resonance image (MRI) can show enhanced imaging of the brain and spinal cord to reveal any lesions that may be on them (" Multiple Sclerosis", 2019). Nerve endings can be damaged or destroyed because of MS. Another tool physicians can use to diagnosis MS is through evoked <https://assignbuster.com/multiple-sclerosis-ms-epidemiology-genetics-and-causes/>

potential tests. This test consists of, “ electrical signals produced by your nervous system in response by your nervous system in response to stimuli” (“ Multiple Sclerosis”, 2019). Physicians want to see how the rate information travels to the nerve pathways (“ Multiple Sclerosis”, 2019). The National Multiple Sclerosis Society discusses the reality of diagnosing a patient with MS, “ At this time, there are no symptoms, physical findings or laboratory test that can, by themselves, determine if you have MS (“ Diagnosing MS”). Test like spinal fluid analysis, blood analysis, or evoked potentials need more research to directly diagnosis MS; however, are good tools to lead to a diagnosis of MS (“ Diagnosing MS”). To diagnoses a patient with MS physicians must rule out other possible diseases or disorders with similar symptoms, which is called differential diagnosing.

Paragraph 7: can cause other health issues/ mental health

Treatment: medication and rehabilitation therapy

There are many different stages and options when dealing with treatment for multiple sclerosis(MS); however, MS has no cure. The National Multiple Sclerosis Society breaks down the treatment of MS in a comprehensive approach, which includes: “ modifying the disease course, treating exacerbations, managing symptoms, promoting function through rehabilitation, providing emotional support” (“ Comprehensive Care”). First, is altering the disease course with medication. There are three types of possible medication therapies approved by the U. S Food and Drug Administration (FDA) to treat relapsing forms of MS which include injectable medications, oral medications, and infused medications (“ Comprehensive

Care"). One medication has been approved to treat relapsing MS and primary-progressive MS, while various others are approved to treat secondary progressive MS ("Comprehensive Care"). The possible outcomes from medication therapies are the reduction in the number and harshness of relapses, the reduction of lesions in the brain or spinal cord, and the possible reduction of overall speed of the disease ("Comprehensive Care"). Relapses are sometimes called exacerbations, and this is caused by inflammation in the central nervous system. Medication therapy is a resource a patient may be able to use to control exacerbations ("Comprehensive Care"). All drugs have side effects, and this is no different when discussing drugs used to modify progression of MS. For the reason, physicians discuss with patients their best options based on cost, type of MS, side effects, life style. According to the Multiple Sclerosis Association of America the severity of the medication given may change the effectiveness but may be a potential health risk, "Stronger drugs may offer greater effectiveness but may also pose greater health risk" ("Long-Term Treatments for Multiple Sclerosis"). There are other treatments for the signs and symptoms of MS.

Physical therapy is an effective way to improve overall daily functions when dealing with MS. It teaches patients how to stretch and strengthen muscles, which can help with total fitness and energy ("Comprehensive Care"). A lot of people who suffer from MS also experience fatigue. One way to reduce fatigue is to build up endurance. Patients can build up endurance through exercise. Rehabilitation works with patients who have MS to either progress or preserve functions at home or work ("Comprehensive Care"). Therapist work on task one needs to live everyday life. Sometimes MS patients need

help walking because of nerve damage and muscles are no longer receiving the correct messages from the CNS (“ Functional Electrical Stimulation (FES)”). There may be braces patients wear to keep muscles working in specific ways (“ Functional Electrical Stimulation (FES)”). Functional Electrical Stimulation can be used instead of braces depending on severity of nerve damage and best interest of patient. This device works by sending low level electrical impulses to nerves (“ Functional Electrical Stimulation (FES)”). In this example the nerves would signal the leg to pick up the foot. Studies do note FES it may not help everyone in this way and it can be expensive (“ Functional Electrical Stimulation (FES)”). There are other possible treatments to manage pain or symptoms for patients diagnosed with MS. Some patients try chiropractic therapy reducing irritation in nerves, marijuana for pain relief, massage for improvement in mood, acupuncture for anxiety or depression, and naltrexone (in small doses) for pain relief (“ Comprehensive Care”). In MS it is common to see depression, anxiety and other mood changes (“ Comprehensive Care”). Mental health is also a part of the treatment process. Addressing mental health issues are hard; however, imperative to patients’ health. Things like acupuncture, massages, family and friend support, or even speaking with a psychiatrist may be helpful ways to improve mental health.

Different forms of MS

Multiple Sclerosis comes in different forms which include: relapsing-remitting MS, secondary progressive MS, primary progressive MS, and progressive relapsing MS. Relapsing-remitting MS is most commonly seen, “...which affects approximately 80 percent of people with multiple sclerosis” <https://assignbuster.com/multiple-sclerosis-ms-epidemiology-genetics-and-causes/>

(“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019). During this form of MS individuals have periods of time where symptoms are active and then will go into periods of times called remission (“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019). When patients experience remission, they do not experience symptoms. There is no known explanation for why people experience triggers (cause to experience symptoms) or remission (“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019). Secondary progressive MS is a form of MS that usually people with relapsing-remitting MS experience after an amount of time (“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019). During secondary progressive MS individual’s symptoms worsen and do not experience remission (“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019). Primary progressive MS is seen in ages forty and up. This type of MS has worsening symptoms overtime, but people do not experience triggers or remissions (“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019). The last form of MS is progressive relapsing MS and it is very similar to primary progressive MS; however, an individual would experience symptoms constantly and more severely (“ Multiple sclerosis – Genetics Home Reference – NIH”, 2019).

Prognosis

Multiple Sclerosis is not often terminal. There can be a huge impact on quality of life and possible disabilities. However, due to the advances in therapies patients are not helpless. In the article, “ Multiple Sclerosis: It’s Not The Disease You Thought It Was” by Loren A. Rolak a good portion of patients can live relatively normal life. Rolak describes this by saying, “...but fully 60% will be ambulatory without assistance and some will have little
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deficit at all” (Rolak, 2003, p. 58). With medication and rehabilitation patients can fight the preconceived notion the public has of MS.

Paragraph 10: reflection

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