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Review On Multiple Sclerosis

Jyotsna Jangra[1]* and Tausif Khan[2]

[1]Department of Biotechnology, Amity University, Noida, Uttar Pradesh, India
[2]Department of Microbiology, SGRR, Dehradun, Uttarakhand, India

Review Article

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***For Correspondence**
Jyotsna Jangra, Department of Biotechnology, Amity University, Noida, Uttar Pradesh, India.

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E-mail: jyotsna.jangra@gmail.com

ABSTRACT

Multiple sclerosis occurs when immune system targets the central nervous system. It affects the myelin sheath which leads to disruption in the signalling process. Damaged myelin forms scar tissue known as sclerosis and inflammation process will take place by T-cell and other antibodies and cytokines. Individual suffers with MS shows various signs and symptoms including neurological symptoms with visual, motor and sensory problems. MS is classified into: Relapsing-remitting MS which later on leads to secondary progressive and primary progressive MS and lastly progressive relapsing MS which is a rare one. There is no particular cure for MS but with the help of medication and therapies, progress of this disease can be reduced.

INTRODUCTION

Multiple sclerosis is a disease that targets the central nervous system. MS attacks the myelin sheath which is an insulating coating around nerve cells (demyelination). It is acknowledged to be an "immune-mediated diseases" rather than "autoimmune" [1-6]. The name of the disease is because the damaged myelin forms scar tissue which is called as sclerosis. When any part of the myelin sheath got damaged, nerve impulses travelling to and from the brain and spinal cord are disrupted which causes wide range of symptoms which can include physical, mental and even psychiatric problems [7-11]. MS continues to progress in a patient, sometimes symptoms may disappear completely but the neurological problems often remains especially when the diseases progress.

Still the cause for MS is unknown, and it is believed that genetics and environmental factors are responsible such as infectious agents. MS is not a hereditary disease but still number of genetic variations is responsible for increasing the risk [12-16]. The strongest genetic factor which consider to cause MS is the (Human leukocyte antigen) HLA-DRB1*1501 haplotype. However, this is only responsible to increases the risk up to 2 to 4 fold and is present in 20-30% of individual [17-22]. Patients can be responsible to increase the risk of MS in their relatives with 20-40% fold and monozygotic twins are more at risk than dizygotic twins. According to the geography, people who live farther from the equator are more prone to have this disease. Statistic has shown that more than 400,000 people in the United States and more than 2.5 million people all around the world are infected with this disease [23-27]. In the United States approximately 200 people or more than that are diagnosed because of this disease.

MS normally starts between the ages of 20 and 40 years and it is the main source of non-traumatic handicap in youthful grown-ups. Initial manifestations once in a while happen before age 10 years or after age 60 years. The strongest genetic factor which consider to cause MS is the (Human leukocyte antigen) HLA-DRB1*1501 haplotype [28-33]. However, this is only responsible to increases the risk up to 2 to 4 fold and is present in 20-30% of individual. Patients can be responsible to increase the risk of MS in their relatives with 20-40% fold and monozygotic twins are more at risk than dizygotic twins [34-37]. Environmental factors which can be responsible for MS are sunlight and UV exposure, EBV that is Epstein-Barr virus, vitamin-D and other viruses or infective agents [38-47]. It is estimated that this diseases is twice as high in northern state where this range is between 110 to 140 cases per 100,000 rather than in southern state with 57 to 78 cases per 100,000 people. In colder climate, there are high chances of getting MS, where northern European people are at higher risk, Asian and Native Americans are at lowest risk of getting this disease [48-55]. Studies have shown that immigrants are tends to take on the risk level either high or low which depends upon the area to which they move.

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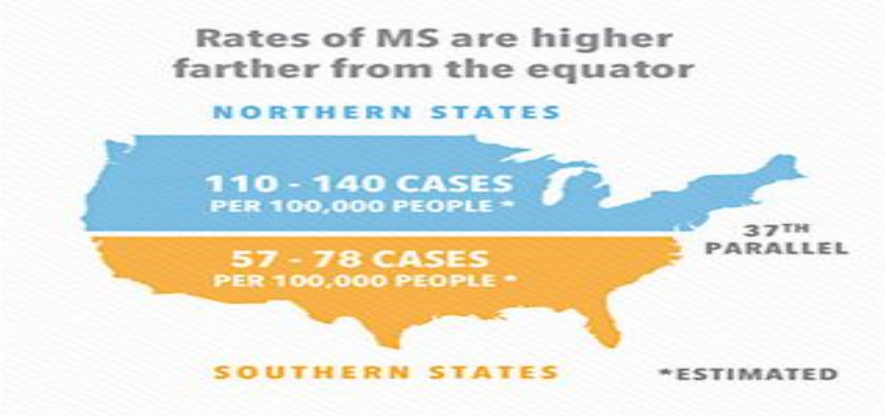

Figure 1: Multiple sclerosis Statistics.

More than 2.3 million people are affected with this disease. Statistics have shown that ratio of women with disease is more than men that is 2:1. MS is not an inherited disease but parents or sibling with MS have 1-3% chances of developing it and in case of twins, risk develops to 30%. People with thyroid problems, inflammatory bowel diseases and type 1-Diabetes are slightly at higher risk of getting MS [56-64]. Some factors may increase the chances of having MS for example: age: MS can affect any person at any age but mostly people between the age of 15 to 60 affected more. Some viruses are also linked with MS like Epstein-Barr, a type of virus which is responsible for mononucleosis. Smoking can also be a factor which can cause MS [65-73]. According to some hypothesis, individuals who exposed to more sunlight and UV rays have a lower incidence of MS which fits to the latitude-based observations but sometimes exception exists. Increased uptake of Vitamin-D results in decreased MS incidence but exceptions are also there with Israeli-born individuals. EBV and MS are also correlated, if at an early age one's exposed to this virus has less chances of MS [74-78].

Pathophysiology

During the progression of MS, there are three main characteristics which MS follows: formation of lesions in the central nervous system which are called as plaques second is the inflammation and third is the destruction of myelin sheaths of neurons. The scar which forms during this disease commonly known as plaque or lesions affects the white matter in the brain stem, optic nerve and spinal cord [79-84]. As MS progresses, there will be thinning or complete loss of myelin which results in the breakdown of the axons of neurons which leads to the point where a neuron can no longer conduct electrical signals [85-93]. In the initial stage of MS remyelination process will take place but oligodendrocytes are unable to rebuild the cell's myelin sheath. Formation of these scars is the origin of MS.

Blood-brain barrier is the crucial part of the capillary system which prevents the entry of T-cell into the CNS (Central Nervous System). This barrier can be broken down because of any infection by a virus or bacteria [94-97]. The inflammation part is carried out by T-cell, which gain entry into the brain via disruption of this blood-brain barrier. T-cell will recognize myelin as a foreign body and attack it [98-100]. This will start inflammatory processes, which triggers other immune cells like cytokines and antibodies to release. Person with MS can show multiple signs and symptoms [101-105]. Most common are any neurological symptoms with autonomic, motor, visual and sensory problems. Visual symptoms can involve: Optic neuritis, Diplopia and Nystagmus, Dysphagia (throat problem), Dysarthria (speech), fatigue, cognitive impairment, depression, anxiety and unstable mood [106-110]. Musculoskeletal problems can be weakness, spasms and ataxia, diarrhea or constipation, pain, paraesthesias, incontinence, frequency or retention (urinary problem).

Multiple sclerosis can be, Primary Progressive MS (PPMS), Relapsing-Remitting MS (RRMS), Secondary Progressive MS (SPMS) and Progressive Relapsing MS (PRMS) [111-115]. RRMS is the common MS type, they will experience new or worsening symptoms known as "relapses" which can last for days to weeks and sometimes month also, then slowly improve over a period of time. Symptoms may disappear with or without any treatment but these attacks can be repeated over several years [116-120]. Periods between these attacks are called as "remission". Some people after many years go on to develop this disease which finally leads to secondary progressive MS. In this type of MS, symptoms gradually worsen over time without obvious attacks. Around half of the people with RRMS will gradually develop SPMS [121-125].

Primary progressive MS affects few of the individual with around 10-20%. In this MS, after the initial symptoms there is no remission and improvements. Progressive relapsing MS describes individuals which have a steady neurologic decline with clear superimposed attacks [126-131]. It is the least common type of MS. There is currently no

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such cure for MS but there is number of treatments that can help to control the condition which depends upon the specific symptoms and difficulties a patient have. Relapses can be treated with short courses of steroid medication which can help to speed up the recovery [132-138]. Also there is treatment available to reduce the number of relapses with medication which is called as diseases-modifying therapies. However, many treatments have unacceptable side effects with some cost-prohibitive issue. McLaughlin mentioned in research about OGF treatment which is a regulatory pathway involving opioid growth factor. OGF therapy initiated at the time of disease presentation [139-145]. Treatments may help the individual to slow or reduce the overall worsening of disability of MS. Unfortunately apart from that there is no treatment for MS. There are currently 12 disease modifying medications available in the market which is approved by the U.S. Food and Drug Administration: teriflunomide (Aubagio), interferon beta-1a, beta-1b, glatiramer acetate (Coaxone), fingolimod (Gilenya), mitoxantrone (Novantrone), Dimethyl fumarate (Tecfidera), natalizumab (Tysabri), alemtuzumab (Lemtrada) [146-150].

Role of Open Access Journals and Global Events In The Awareness Of MS

Now-a-days more number of people is being diagnosed with MS. There is now increased awareness of MS and better diagnostic tools are available for the treatment of MS. Open access journals are also played their role in increasing awareness, it provide a platform for the researchers to update their current knowledge about the MS to the people. More the awareness is less chances of having MS in a population. Journal of Multiple Sclerosis is one of the journal which provides latest research on MS. Along with that Journal of Neurological Disorder is another open access journal with highest impact factor. These open access platforms encourage the researchers from all parts irrespective to economical and geographical barriers to publish novel findings in their peer-reviewed journals. More or less these journals help to fills the gap between the academics, clinicians and other professionals. Brain disorders journal serves the International scientific community with its standard brain research publications. Neurophysiology Journal is a scientific journal that deals with the diagnosis and treatment of all categories of diseases involving central, peripheral and autonomous nervous system.

To improve the understanding about MS, scientific conferences drew attentions of the researchers where discussion and panel meetings help to disclose more specific knowledge about those diseases. Conferences like 10th International Conference on Neuroscience and Neurochemistry which is organized by Conference Series LLC where experts will discuss about this field. For more knowledge on MS, there are some more conferences like 11th World Congress on Neurology and Therapeutics, and 3rd International Conference on Neuroinfecticious Disorders.

CONCLUSION

Multiple sclerosis is one of those diseases which continue to progress in the body with no cure at all. It is an immune-mediated disease which directly effects on the coordination between the electrical signal to and from the brain. FDA has approved some of the drugs which can help in reducing the progression of MS in the body and some therapies are also there for MS. Taking these medicines doesn't approve that MS is treatable because sometimes despite everything a patient and physician do, MS still continue to get worse in some patients. Despite all of these, drugs and therapies may enhance the quality of life.

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