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Original Article

MS Disease and Providing a Biologic Perspective and Reducing the Symptoms of the Disease with the Help of Stem Cells

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ABSTRACT

Introduction: MS is one of the most common inflammatory diseases of the central nervous system, with the destruction of nerves. One of the symptoms of MS disorder is dystonia, fatigue, spasticity, disturbances, lack of sensation in the organs, cognitive impairment, weakness, tremor, pain, bladder and bowel dysfunction. **Method:** The search was carried out in the Pubmed/ Medline database. 63 The study was designed to investigate patients with MS and therapeutic samples that were materially similar to the current research, and are included in this article. **Findings:** Therapeutic injection methods in MS have responded, but patients are still in trouble. Studies have shown that the use of stem cells for treating patients with MS has been fruitful and can be used to treat MS. **Discussion:** As it has been said, the most important treatment challenges in this way is to reduce treatment, and moreover, that anti-MS drugs in advanced forms are limited. Hence, the production of new, improved medicines for the complete treatment of MS is essential. Stem cells play a veryw important role in the repair process, and the complications of these cells are low in patients and provide an acceptable response. Reliably, the focus on new immunology methods with more biological properties has a greater impact on the treatment category. They will have patients.

INTRODUCTION

MS is a common inflammatory autoimmune disease of the central nervous system along with demyelination (destruction of the nerve cell membrane) of the nerves (1). Research has shown that it is one of the most common neurological diseases that occurs more commonly in women and among adolescents (2). In Europe, the United States, New Zealand and Australia, the prevalence of this disease is almost one in 1,000. The prevalence of this disease in the world has increased dramatically in recent years. (4) The findings suggest that this increase may be due to improvements in diagnostic and lifestyle modalities (vitamin D deficiency and increased smoking). (5). Some of the symptoms of the disorder include double vision, fatigue, spasticity, lack of sense in organs, disturbances, cognitive impairment, weakness, tremor, pain, dysfunction of the bladder and intestines (6,7). In addition to the symptoms mentioned, many anomalies There are nerves such as functional impairment (6), memory impairment (8), attention (9), and information processing in these patients (10).

So far, four major types of MS have been identified. The first known type of relapsing-remitting and most common type of MS is the relapsing remitting form. About 85% of patients are in this category. The patient suddenly develops attacks that involve one or more parts of his body. The second is secondary progressive type, which is initially the relapsing remitting type and ultimately changes to the progressive type. The third is primary progressive type, which consists of about 8-10% of cases in which neurons are continuously degraded and their patients become worse and no improvement occurs during attacks. The fourth is progressive relapsing form and From the beginning, they have progressive lesions, but they also develop acute attacks that appear and disappear after a while (11-13), but in all patients with MS, skeletal, neurological, and equilibrium disorders (16).

One of the best methods for treating MS is the injectable method, which is the most commonly used treatment regimen in the form of relapsing-remitting MS-infected β-interferons 1a or 1b and glatiramer acetate. is. But one of the most important treatment challenges in this method is to reduce treatment in about 50% of patients only during the first year, and moreover, that anti-MS drugs can reduce the effects of RRMS, but in advanced forms (PRMS) Restricted. Hence, the production of newly improved drugs for

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MS therapy is definitely indispensable. By examining the immune system, there can be a lot to MS. One of the most important pathophysiologic mechanisms for the activation of T lymphocytes is the help of T lymphocytes that enter the brain through breaks in the blood-brain barrier. These cells recognize and attack the myelin of the nerve fibers as a foreign agent. By creating an inflammatory message by T cells, other immune cells, namely macrophages, migrate B cells to the site of inflammation. By continuing to attack the immune cells, immune cells increase to release more cytokines, and inflammation becomes more severe and is destroyed in the first depression of the myelin (Figure 1 shows the damaged myelin sheath) (1.14,15) The proliferation of inflammation, the formation of plaque sclerosis, and nerve lesions, make demyelination. (17) MS lesions may be formed in either the white or gray matter of the central nervous system. Creating lesions in gray matter often results in physical disability and sometimes cognitive decline (16,17). The main components of the myelin sheath that affect T cells and detect antibodies include myelin base protein (MBP), glycoprotein, myelin oligodendrost (MOG) and protein proteolytic (PLP) (22, 20). Therefore, the problem that has been mentioned in many studies is that it can be targeted by targeting immune cells and their products from damage And prevented further inflammation (19.18), which has been shown to reduce potential side effects in this therapeutic approach (20,21,22).

METHOD

The study examines MS by providing a better, simpler, and new perspective on the disease through the categorization of research topics and important aspects associated with Tinto's disease from 1973 to 2019. PubMed, Medline, Cochran library, WHO, Iranmedex were used to access the articles in this study. In order to collect information about MS, the keywords were searched for in the bases under the heading MS, MS and Treatment, MS and Risk, MS Disease and others. Articles containing duplicate content after deletion were reviewed, and out of a total of 936 articles, 51 articles that were relevant to the subject coverage and content structure were used in this review article.

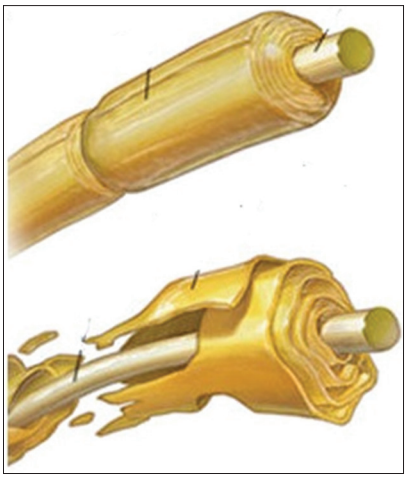

Figure 1. The myelin sheath is destroyed

IMMUNOPATHOLOGY OF MS

The brain is extremely protected as a very safe member (22). In the last 10 years of the last major study, it has been determined that MS is not just a simple immune disease, but changes in the central nervous system (CNS) contribute to the development of various conditions (23, 24) with damage to the CNS tissue of the cell The immunosuppressants in the CNS, called microglial cells, are activated. Microglia acts similar to macrophages in other tissues that expand the components of the inflammatory response by phagocytosis, antigen supply, and the production of cytokines and chemokines. It can be noted (22).

The presence of severe inflammation in a common symptom in neurological diseases such as MS, Alzheimer's, Parkinson's disease (22, 25) is associated with degradation of myelin tissue in the neural nerves, triggering the activation of T cells, and the migration of immune cells and passing through the dam Brain and hypodermic inflammatory responses to inflammatory response. CNS demyelination and axonal injury begin (26.20). MS scars occur in the white matter inside the vision neuron, the ganglion, brain and spinal cord of the brain. (27) White signal protein cells Neurons are transmitted from gray matter, and from there the information is collected and transferred to the rest of the body (28) MS has two main stages: 1- Myelin sheath damage resulting in CNS lesions and / 2-inflammation, which destroys the nerve tissue (30 and 29) in MS, damage to the oligodendrocytes, and damage to the myelin sheath, results in the breakdown of the nerve axon and loss of nerve function. 30). Deletion stimulates inflammatory activation processes and stimulates macrophage activation and the oxidative stress pathway leading to damage to the blood-brain barrier (31) white matter lesions from degenerated myelin along with the penetration of monocytes, B cells, T cells and dendritic cells are formed (32).

MS AND STEM CELL

An important part of the article is the relationship between MS and stem cells from the treatment point of view. The stem cell is characterized by two important properties: one is a self renewal without differentiation, and another has the potential for conversion and differentiation to a variety of specific cells (33). These cells are found abundantly in umbilical cord tissue of infants, but in adults A source of stem cells such as bone marrow, adipose tissue and brain (34,35,36) are stem cells in adults known as stem cell stem cells or stem cells, and those cells Bone marrow extracts are commonly referred to as mesenchymal stem cells (MSCs) (37).

Caplan et al. (1991) argued that stem cells excreted from bone marrow, capable of differentiating into cartilage and bone (38). Later, osteogenic, adipocyte and cardiomyocyte precursors were found in the mesenchymal stem cells isolated from the brain and bone (Figure 2). (39).

In the following years, it was found that mesenchymal stem cells have many advantages, including the ability to differentiate into the cells of all three layers of endoderm

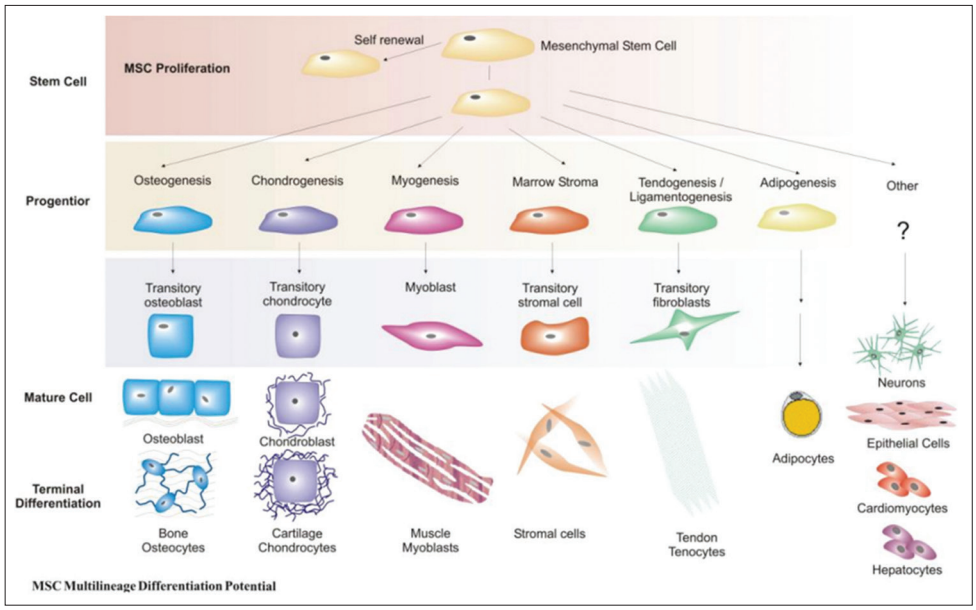

Figure 2. The potential for polysemy differentiation in mesenchymatic stem cells

(hepatocyte), mesoderm (osteocyte, adipocyte, cardiomyocytes) and ectoderm (nerve), so Is a good alternative to cell therapy. Research has shown that these cells retain their normal karyotype after successive passages, and the rate of proliferation of these cells from bone marrow stem cells is higher (41.42) An important feature of MSCs is their nesting capacity. Implantation capacity is defined as the need for this cell Walls migrate to the site of injury. In the MSCs implantation process, the most important evidence is that receptors that show inflammation that play an important role in the immune system's performance. On the surface of the chemokines, cytokines are exhibited by these cells. (43) The implantation process in the immune system is performed to greatly help the recipients in the immune system to eliminate external tumors and tumors, especially CD44 is most important in the process of implantation of Meshchyla cells (MSC (Mouse and Human) (44,43).

MSCs also have immunogenic and protective effects, which not only activate and activate T lymphocytes but also NKs of B cells and immature endodontic cells under the influence of MSCs. The effects of MSC re-immunosensitivity on T cells and NK cells have been shown to affect the secretion of immune molecules such as TGF-β, PGE2, and IL-10, and indirectly affect the lymphocytes of B and these cells are influenced by the effect of zinc Expression of the cells in the plasma leads to a change in these cells, which results in inhibition of secretion of immunoglobulins (45,42).

MESENCHIAL STEM CELLS AND MS THERAPIES

Bone marrow transplanted mesenchytic cells decrease the inflammatory response and stimulate neural stem cells, increase the differentiation and promote the reconstruction of damaged areas in the central nervous system (46,47) when inflammation occurs At the site of damage, the accumulation of cytokines and kimokins increases, and the expression of chemical receptors in these cells and the affected environment increases, which increases the migration of MSCs to damaged tissues and accelerates the reconstruction (48) Studies in mice have shown that intravenous and intraperitoneal injection of mesenchytic cells reduces the symptoms of the disease MS (49,50,51) Studies also show the anti-inflammatory and regulatory effects of the immune system that have been associated with a decrease in activity and suppression of T cells (50).

MSC was first used in MSC in 2007 to treat MS. In these studies, there was no specific treatment for MS in 19 months. But in subsequent studies, the studies showed the potential for MSC treatment for MS patients (52.53). However, several studies have been done, in 2010 a group of stem cell transplantation experts called the International Panel on Mesenchymal Cells Studies, due to the importance and therapeutic indications derived from this method, has a clear protocol on the use of MSCs. For the treatment of MS to the biomedical research community (55). In recent years, studies on the central nervous system have shown improvement in neuropsychiatric potential and the therapeutic role of MSC (54).

DISCUSSION

As stated above, the most important treatment challenges in this approach are to reduce treatment over the next few years, and moreover, that anti-MS drugs in advanced forms are limited. Hence, the production of new, improved medicines for the complete treatment of MS is essential. On the other hand, along with common treatments, attention to new treatment is important. As described in the Mesh cellular and MS patients, stem cells play a very important role in the repair process, and the complications of these cells are low in patients and provide an acceptable response. Unfortunately, the number of articles that have been specifically researching the molecular performance of biological methods related to MS disease is very low in Iran. It is advisable to

further research in this area and other biological sectors such as DNA vaccines, nanoparticles, modified peptide ligands that are in progress. Reliably focusing on new immunology methods with biological properties will have a greater impact on the therapeutic category of MS patients. It is suggested that Iranian researchers consider the biological issues related to the functioning of different types of stem cells and the strengths and weaknesses of these therapies, in the hope that these methods will once again be used as common medical treatments for patients.

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