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MULTIPLE SCLEROSIS. A SCIENTIFIC REVIEW FROM 2016 TO 2022

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ABSTRACT

Multiple sclerosis is a disease that is characterized by the nervous system injury. The pathophysiology is unknown, but it is supposed that it is caused by an increase of the immune response to the myelin sheath, which causes damage in the nervous system. Actually, there are a lot of immunomodulatory drugs to control this pathology. One of the most important aspects of this disease is the fact that it is irreversible; therefore, the use of drugs for this illness is just for the control of the symptoms; nevertheless, some review has shown the free-recurrency of multiple sclerosis. Nowaday, there is information that defines the effectiveness of Rituximab, Alemtuzumab, Fingolimod, and many more drugs. In the non-pharmacological aspects, there is information about the diet and its non-action in the progression of Multiple Sclerosis. When a patient presents fatigue, there are many alternatives for the control of this. Finally, activities which stimulate social interactions have shown little effectiveness in these patients.

KEYWORDS: ***Multiple Sclerosis,Nervous System,Immune System***

1. INTRODUCTION

As is well known, multiple sclerosis is a chronic pathology that affects the nervous system and is most prevalent in young and middle-aged adults. To understand its action, it has been determined that recurrent damage to the myelin results in severe disability. An aspect of the pathophysiology of this disease is its relationship to the immune system and the origin of this pathology; therefore, all immunomodulatory therapies are the main therapeutic pillar. Now, the fundamental element of the physician is the

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communication to the patient so that the patient knows in a complete and precise way about his pathology and the most appropriate decisions are taken.[1][2]

Multiple Sclerosis Drug Analysis

The use of a biologic drug called Alemtuzumab was analysed and studied in comparison to other drugs (interferon beta 1a) to determine its effectiveness. It was determined that the use of Alemtuzumab in annual doses reduces the recurrence of multiple sclerosis, in addition to reducing the risk of new or larger lesions (evidence detected by MRI), especially with doses of 24 mg.[2][3]

Fingolimod is another drug used for multiple sclerosis because of its immunomodulatory actions. It was studied in 5152 patients with recurrent-remitting multiple sclerosis, where it was administered 0.5 mg daily. In the end, it was shown to increase the likelihood of being recurrence-free for 2 years (effect confirmed by MRI) and in being free of inflammatory lesions.[4]

One drug that has been used as an effective treatment for this pathology, considering its immune pathophysiology, is Rituximab. For this reason, 15 studies of a total of 16,000 patients were analysed in which Rituximab was administered to establish its efficacy. It was determined that:

- In recurrent multiple sclerosis, it reduces the number of relapses, compared to natalizumab, dimethyl fumarate, glatiramer acetate or interferon beta. In the case of use as an alternative therapy, there was a slight increase in common infections.
- In progressive multiple sclerosis, there is no difference in worsening disability over 2 years.
- In recurrent multiple sclerosis (used as an alternative), it reduced relapses.[5]

The administration of Siponimod in patients with multiple sclerosis has also been studied. The drug binds to lymphocytes (responsible for attacking the central nervous system) to prevent them from migrating to the brain and reduces the immune system's attack. 2 studies of 1948 patients given 2 mg daily showed:

- Small reduction in relapses for up to 6 months to 1 year.
- Reduction of brain lesions at 6 months to 2 years follow-up.
- Decrease in disability assessed for 6 months after the start of treatment.

Nevertheless, headache, low back pain, asthenia, lymphopenia and suspected liver damage were reported as adverse events associated with this drug.[6]

Studies show that early treatment reduces the likelihood of a second episode in the first 2 years. For example, in patients on teriflunomide, 32 patients out of 100 were found to have recurrences. For glatiramer acetate, interferon beta 1b, or interferon beta 1a, 64 patients out of 100 had a recurrence in up to 5 years with early use of these drugs. An additional finding was that there were fewer dropouts with the use of interferon beta 1a and teriflunomide.[7] Within the comparison between interferon beta and glatiramer acetate and which of the two had a greater benefit, it was concluded that they have a similar effect and small differences related to progression or recurrences.[8] In relation to Teriflunomide, a dose of 7 to 14 mg daily reduces recurrences for up to 2 years with its use. The use of 14 mg daily, on the other hand, reduced progression to disability.[9]

A condition called chronic cerebrospinal venous insufficiency is a condition that restricts cerebral and spinal cord venous flow, caused by venous obstruction or stenosis of the head and neck. The disease is mentioned because it is assumed to be a key player in the development of multiple sclerosis. However, when cerebrospinal venous insufficiency was treated with catheter phlebography or percutaneous transluminal angioplasty, it was found that there was no benefit in terms of function (cognitive or physical), quality of life or relapse. Therefore, in patients with chronic cerebrospinal venous insufficiency, percutaneous transluminal angioplasty is not recommended.[10]

An interesting aspect studied was breathing. This is important because patients who have progressed in relation to the severity of this pathology have developed a decrease in respiratory muscle strength and endurance, leading to weakness of the respiratory muscles. Therefore, in these patients (195 patients) we analysed whether the use of a threshold device (respiratory device that increases resistance to inspiratory flow) had any benefit in these patients. It was found to be effective in improving peak inspiratory pressure.[11]

An ever-present symptom in these patients is fatigue. Fatigue can affect daily life and quality of life. An analysis of 4696 patients looked at the use of medications such as amantadine, donepezil, pemoline, carnitine and modafinil. Overall, modafinil, pemoline and amantadine have an effect on reducing fatigue in patients with multiple sclerosis. In patients with multiple sclerosis and cancer, donepezil, methylphenidate and carnitine were shown to have a beneficial effect in reducing fatigue. In patients with multiple sclerosis and HIV/AIDS who experience fatigue, the administration of pemoline or methylphenidate has a benefit in reducing this symptom.[12]

Rehabilitation in all patients with multiple sclerosis aims to improve the functionality, well-being and quality of life of these patients. Now, there is a clear need to analyse how beneficial rehabilitation (physical activity, hyperbaric oxygen therapy, cognitive, psychological and spasticity management interventions) was. Therefore, 168 trials of a total of 10396 patients were analysed, showing a great benefit in relation to activities of daily living, quality of life and functionality.[13] In addition, the application of palliative care in these patients was analysed and compared with their usual care. However, no benefit was found.[16] In relation to patients with chronic pain and the use of non-pharmacological therapies, attempts were made to provide them with therapies such as reflexology, hydrotherapy, transcranial stimulation for pain management; however, none of these therapies have benefits in relation to chronic

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pain.[14] The use of social activities, cognitive activities, physical activities, board games and music in patients with multiple sclerosis allows them to improve psychological well-being and coping.[15]

Although this may be a controversial topic, we examined whether dietary interventions (monounsaturated fatty acids, vitamins, antioxidants, etc.) have any benefit. Against this background, we decided to analyse 30 trials related to this topic. In the end, little or no difference was demonstrated in relation to the consumption of monounsaturated fatty acids or antioxidant supplements.[17][18]

For their fall-related conditions, they are provided with exercise counselling, meditation, nutritional therapy, psychological interventions, among others, to prevent these events. An analysis of 13 studies of a total of 839 patients found improved mobility and balance with exercise-related interventions.[19]

In relation to memory-related interventions (activities necessary to improve patient independence and performance of daily activities), 44 studies of a total of 2714 patients found that memory rehabilitation improved functioning and quality of life, although there was no effect in relation to improvement in activities of daily living or decreased anxiety.[20]

2. CONCLUSION

Multiple Sclerosis is a nervous system affection that is caused likely for the interaction between myelin sheath and the immune system, which causes a destruction of this coat and, for instance, the affection of areas related to the nervous system. Actually, there are a lot of medications that are able to maintain in control the immunological effects and avoid the progressive injury of the nervous system; that means all drugs are used to avoid the symptomatology and its effects in the patient, but it's not a curative disease. Nevertheless, it's necessary to keep investigating to achieve an effective cure for this disabling illness.

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