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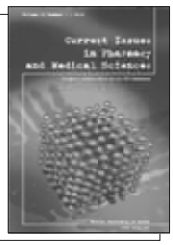

Multiple sclerosis – epidemiology, diagnosis, treatment and rehabilitation – a literature review

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ABSTRACT

At present, multiple sclerosis is regarded as disease in which the immune system fights its own cells, in this case the nervous tissue. The World Health Organisation (WHO) estimates that 2.5 million people in the world suffer from multiple sclerosis, of which 40-60 come from Poland. The costs incurred in relation to the disease are high due to the duration of the disease, a quick loss of the ability to work by people suffering from it, and due to the high costs of immuno-suppressive treatment and broad medical care.

Keywords: Multiple sclerosis, diagnosis, epidemiology, treatment, rehabilitation

INTRODUCTION

The epidemiology of multiple sclerosis. Multiple sclerosis is the most frequent demyelinatory disease of the nervous system. First symptoms usually occur between the ages of 20 and 40, and seldom appear before the age of 15 or after the age of 55 [1]. Evidence also suggests that women contract the disease more frequently than do men. Multiple sclerosis is a life-long disease. The average survival age in first world conditions is 25–35 years. This means a decrease of the natural survival time by approximately 6-7 years, which is usually caused by complications of long-lasting neurological symptoms and immobilisation. The frequency of SM (prevalence rate) in Europe and United States amounts to 40–150 cases per 100 thousand inhabitants, and the incidence is approx. 3–5 cases per 100 000 [9]. In Poland approx. 3 cases of SM are recorded per 100 000 inhabitants per year [1].

Diagnosing multiple sclerosis. A neurological examination is carried out when the patient reports to the doctor's room or to a ward, where there is an opportunity to observe the patient's behaviour. In the patient's examination, her or his medical history and a thorough physical examination are important. The gathered detailed knowledge of the pathological process and a properly performed neurological examination, in the majority of cases, make it possible to pass a clinical diagnosis [4]. In the diagnostic process of SM, attention is also paid to the characteristic symptoms and the clinical course of the disease, as well as the results of laboratory examinations [6]. If two relapses of the disease and multiple neurological symptoms are identified and point to the impairment of the nervous system in various locations (e.g. damaged visual nerve, limb paresis), the disease can be detected without any additional diagnostic tools. However, most often, patients come to the doctor after the first relapse of the disease or without documentation in regard to previous exacerbations.

Among the imaging examinations, magnetic resonance imaging (MRI) is the most applicable. The occurrence of foci in the white matter of the brain, usually in the periventrical area, is characteristic of SM [6]. Hyper-intense lesions in the brain in T2 time are present in 95% of patients with SM. However, in the primary progressive presentation, there are usually less lesions in the brain. These lesions prevail for 4–6 weeks and appear 10 times more often than the clinical symptoms of the relapse. In some cases, it is useful to repeat the examination after 3 or 6 months in order to observe the sclerosis in time and in terms of location [4]. Furthermore, an atrophy of the cord, resulting from the axonal impairment and correlating with motor disability, is detected in 13–41% patients. It must be noted that the number and quality of demyelinatory foci depends on the duration and advancement of the disease [3].

Among the diagnostic tools used in ascertaining SM, electrophysiological examinations are applied. These include evoked potentials (visual, auditory and somato-

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sensory). "Evoked potential" refers to an examination involving affecting sensory receptors with a particular stimulus and thus triggering bioelectric activity ("evoked potentials") in the respective area of the cerebral cortex [8]. Improper results of these visual auditory and somatosensory evoked potentials are detected in 50–70% of patients. The examination that involves visual evoked potentials is of greatest diagnostic significance, and results that show improper potential provide the grounds for diagnosing a focus of demyelination [4, 6].

In order to recognise multiple sclerosis, an examination of the cerebrospinal fluid (obtained through a lumbar puncture) is carried out. In patients with SM, a specific increase of IgG is identified in the cerebrospinal fluid, together with the presence of oligoclonal proteins (96% of patients), while total protein concentration is normal or slightly increased. The number of white blood cells in the cerebrospinal fluid is also usually normal, however, there can be a slight increase in the prevalence of lymphocytes [4].

The treatment of multiple sclerosis. The purpose of the treatment is to mitigate the relapse, to prevent the progression of the disease as well as to eliminate the symptoms. In order to mitigate the relapse, corticosteroids are applied according to various models. Methylprednisolone (Solu-Medrol) is most frequently used, then prednisone (Encorton) can be applied, with a gradual reduction of the dose. Corticotropin (ACTH) is currently rarely used. However, some professionals recommend its use, but only when a treatment involving methylprednisolone proves to be ineffective. In turn, the treatment modifying the progression of the disease has the purpose of reducing the frequency of relapses and postponing the progressive presentation of the disease. This treatment includes interferon-beta (IFNβ), a preparation from the group of immunomodulatory medicines which has antiviral and antineoplastic functions. [4, 6].

In Poland, the following three IFNβ preparations are registered: IFNβ-1a (Avonex and Rebif) and IFN-1b (Betaferon). These medicines are used on a regular schedule in patients showing a relapsing-remitting presentation, and they decrease the number of relapses by approx. 30% [4, 6]. If the progression of the disease is significant, despite treatment, IFNâ can be changed into glatiramer, and a medicine with a different effect may be added, e.g. cyclophos- phamide. Glatiramer acetate (Copaxone) probably inhibits the activity of effector T lymphocytes [4]. Immunoglobulins administered intravenously in high doses have also been applied for a long time in the therapy of some autoimmune diseases, including of the nervous system, e.g. myasthenia, in inflammatory and demyelinatory polyneuropathies (including multiple sclerosis) [4, 10].

The first medicines which demonstrated a modifying influence on the course of multiple sclerosis were immuno--suppressive medicines. However, a serious obstacle in their broader application is their considerable toxicity. Azathioprine (Imuran) is used for patients with fast-progressing disease (very frequent relapses, increasing disability). Methotrexate is also applied when the progression of the disease is fast. In small doses, it has an inflammatory and immuno-modulatory effect, while the cytotoxic effect is slight. Cyclophosphamide is a strong drug with immunosuppressive and cytotoxic properties. At present, it is not generally recommended, but it is used in severe presentations of the disease. Mitoxantrone is a medicine with immuno-suppressive and cytotoxic properties, and it is also used in cases with frequent relapses and quick progression of disability [4, 10].

Symptom management includes the treatment of spasticity in order to improve motor skills, prevent complications, decrease pain and enhance care. The following medicines are used in the treatment: Baclofen, Tizanidine, Diazepam, Clonazepam, Dantrolene, Tetrazepam. In severe cases, botulinum toxin is administered locally [4, 6]. In the case of ataxia and coordination disorders, there has been attempts to apply gabapentin and ondansetron or neuromodulation with the use of DBS Vim – deep brain stimulation of the ventral intermediate nucleus. This is a surgical method of treatment consisting of implanting a device called a brain pacemaker, which sends electric impulses to a particular part of the brain [4, 7].

Vexing pain, including the pelvic girdle, shoulders and face, are treated with: carbamazepine, baclofen, imipramine, or gabapentin. In severe cases, it may be necessary to surgically reduce the posterior roots or to administer morphine intrathecally. In treating overactivity of the detrusor muscle, the following are applied: Hyoscini butylbromidum, Tolterodine, Oxybutinin. Doxepin considerably decreases night pollakisuria and night urinary incontinence. In the case of urine retention, neostigmine or pilocarpine are administered. In the chronic fatigue syndrome, amantadine or modafinil are applied [4,6].

The rehabilitation of patients with multiple sclerosis. Rehabilitation in multiple sclerosis encompasses multidimensional patient care. The purpose of rehabilitation is to achieve and maintain maximum physical, mental and social health, at a given point of time, for a particular patient [2]. In Poland, there are a few specific scales evaluating the quality of life. However, self-enumeration questionnaires are of best use. This is because a self-evaluation by the individual patient provides a true picture of the influence of the disease on his/her functioning and state of mind [5].

A complex rehabilitation process that is conducted by an experienced physiotherapist, in combination with psychotherapy and symptom management, is regarded as the most effective symptom handling technique in patients with SM [2]. Both physiotherapeutic rehabilitation procedures and occupational therapy prevent contractions and help patients deal with motor disability. However, excessive exercise can lead to a deterioration of the patient's condition [4]. Rehabilitation treatment should thus be adjusted to the patient's individual needs and to his/her environment, as well as to the type and degree of disability [2].

Patients with SM, in Poland, require long-term medical care. This involves multiple diagnostic examinations, as well as therapeutic procedures and rehabilitation. This engenders high costs within medical and non-medical institutions, as well as by the family of the patient itself [11]. Various forms of orthopaedic equipment and home appliances adjusted to the patient's needs considerably improve their functioning; however the costs of these items are frequently borne by patient's families themselves [4]. Regular actions aimed at rehabilitating the patient and which allow him/her to acquire skills that make it possible to function despite this disability (improving the walking pattern, dealing with spasticity), result in the patient's improved self-image and he or she being better able to cope with everyday activities. His or her mental condition is also very important, because the patient having a positive psychological attitude is necessary for the complete effectiveness of physiotherapy [2].

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