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Multiple sclerosis and dizziness in the elderly

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Abstract

Background:The essence of sclerosis disseminated, characteristics of the symptoms of this disease and familiarization with the main difficulties that sick people face.
Material and methods:The methods used to treat balance disorders and dizziness are pharmacotherapy, vestibular rehabilitation, lifestyle changes and surgical treatment.
Results: The results are not very optimistic, treatment is not too easy symptoms are manifested in motor dysfunction leading to even disability
Conclusions: Multiple sclerosis is a disease affecting the nerve center of unknown etiology which makes treating difficult. The onset of the disease is often dizziness or headache.

Key words: multiple sclerosis, balance disorders, dizziness, older people

Introduction

Multiple sclerosis (SM) is a disease of the central nervous system. It is a chronic inflammatory demyelinating disease. In its course, axon myelin sheaths are damaged. The etiology of the disease has not been fully understood. It is believed that the underlying disease is a disorder of autoimmune processes, as well as genetic and environmental factors. The course of the disease is diverse, which creates difficulties in treatment [1,2].

It is estimated that over 2.5 million people worldwide suffer from SM. The number of patients in Poland ranges from 50,000 to 60,000 [3]. The first symptoms of SM are most often at the age of 20-40, however, the onset of the disease may also occur in children or the elderly. Women suffer 3-4 times more often than men. The occurring symptoms can be divided into motor symptoms and non-motor symptoms. The occurring symptoms affect many areas of the patient's life, including social, sexual, family, professional and emotional life. In patients with advanced stage of the disease there are many complications such as urinary tract infection, renal failure, pneumonia. In the worst case, there is a total loss of the ability to function and disability. This makes the patient dependent on others, which significantly affects the quality of his life. As a result, patients with SM often have depression, which additionally complicates the treatment process. The disease is incurable. Its complex treatment requires a holistic approach, which encourages the cooperation of specialists from many fields of medicine [1,2,3,4].

Symptoms of multiple sclerosis

Multiple sclerosis (SM, sclerosis multiplex) belongs to multifocal diseases that affect various parts of the central nervous system. Scattered foci of demyelination cause numerous symptoms and irreversible changes in the nervous system. Their location takes various clinical forms. Considering the course of the disease, five different clinical forms can be distinguished: mild form (BS MS), relapsing-remitting (RR MS), primary progressive (PP MS), secondary progressive (SP MS) and relapsing-progressive (PR MS). Due to the coexistence of characteristic sets of symptoms, three forms of MS were distinguished: spinal, cerebellar and cerebral. In the course of the disease, clinical syndromes may change, by the appearance of new symptoms or exacerbation of existing ones. The smallest percentage of patients is affected by the cerebral form in the course of which seizures, aphasia and hemiparesis may occur [5,6,7,8].

The most frequent manifestations of the disease are movement disorders caused by damage to the corticospinal tract (spinal form). In more than half of the patients, the first symptom of MS is the paresis of one or both lower limbs, which is usually spastic. The paresis may also affect the upper limbs. Involuntary contractions of muscle fibers (clonus) and paresthesia may appear. Slack paresis is rare. Patients complain of fatigue in their lower limbs which makes them walk spastic-atactic. Neurologically, exaggerated stretchy reflexes and positive pathological symptoms are often found [5,7]. Movement symptoms may be accompanied by proprioception disorders in the form of impaired vibration sensation or lower limb placement. Vegetative disorders, in particular sphincter dysfunctions, are bothersome signs of this disease. Patients have problems with incontinence in the course of the spastic bladder. The micturition can be uncontrolled, too frequent or stopped [6,7].

Apart from symptoms of spinal cord injury, symptoms of cerebellum damage, such as tremor of upper limbs, limitation of motor coordination and difficulty in alternating movements often occur. The more rarely occurring cerebellar form occurs in the late stage of the disease with a triad of Charcot's symptoms beginning with the appearance of an intention tremor which making the planned activity impossible. Then the occurrence of nystagmus and in the last stage the appearance of the scanning speech. In the course of the disease the cranial nerves supplying the eyesight organ may be damaged which cause

defects in the field of vision and thus its impairment. Inflammation of the second cranial nerve (nervus opticus) manifested by a deterioration of visual acuity and sometimes a complete blindness often eradicates as the first symptom of the disease. Paralysis of the oculomotor nerve causes the patients to have double vision in the eye, as a consequence of the ocular hypoplasia. Among 70% of MS patients there may be nystagmus accompanied by dizziness and vomiting. In young people the first symptom is often trigeminal neuralgia [5,7].

Multiple sclerosis most often occurs with relapses of exacerbations and relief of symptoms. The projections of the disease appear at a frequency of about 1-2 times a year, and the remission period may last for a long time, even up to 30 years. Disease rarely progresses taking the form of Schilder manifesting itself to non-classical symptoms of MS, such as epileptic seizures or disturbances of consciousness, sometimes leading to rapid death. However, difficult prognosis gives patients about 25-35 years of life from the time when the disease is diagnosed. Functional options of patients depend on the duration of the disease. According to the research, people who have multiple sclerosis for up to 5 years may be fully independent or with minor physical deficits [5,6,7,8].

The variety and multifocal nature of symptoms, as well as difficult prognosis, often causes unpredictable mental reactions among patients. Increasing difficulties with self-performed basic everyday activities and the loss of self-reliance lead to a lowering of mood, narrowing of interests and even depression. Intellectual disorders are quite common, and dementia and cognitive impairment in the final period of the disease [5,6,7].

Balance disorders, motor coordination and dizziness - definition

Dizziness is not a disease. Dizziness and balance disorders are subjective feelings that appear due to the malfunctioning of the balance system. Gyration occurs due to instability and imbalance. For full diagnosis and treatment, it is important that the other person understands what exactly the term means. Dizziness is difficult to diagnose. Dizziness and balance disorders may be the result of gentle illnesses, but also serious illnesses. Studies show that the most common reason dizziness is peripheral disease. Therefore, in multiple sclerosis dizziness is rarely the only symptom. Dizziness can be one of the first symptoms of multiple sclerosis. They can often be accompanied by other ailments such as dysarthria or double vision [9,10,11].

Patients often use the term "dizziness" to describe their feelings. This is because the term has many meanings. It can mean an illusion of movement, or the feeling of spinning the body and surrounding, rocking, shaking. It can also mean an illusion of unstable, or unstable posture and gait or weakened lower limbs. Dizziness according to the patients may also be: confusion, fear of space or height, fear of falling [11].

There are many definitions of dizziness and disturbances in the literature. These include: the feeling of a sick movement, usually rotational, in its absence, a feeling of fear, discomfort and fear, a subjective impression of a whirling movement that affects the entire surroundings or body of a person, a sensation of movement without interference from the external environment [11,12,13].

As you can see, there is no single exact definition of an imbalance or dizziness. Many authors present various descriptions and therefore these concepts have a wide range of meaning.

Balance and coordination disorders - division, causes, symptoms

There is no clear division of imbalances. Many authors divide them in various ways, following the criteria they considered the most important as: symptoms, localization of lesions, factors causing the disorder.

One of the divisions is the differentiation of imbalances in the central and peripheral syndrome. The disturbances of the balance in the central syndrome are characterized by the feeling of static shaking and insecurity, collapse, lifting, pushing from the outside and disturbance of orientation in space. The patient has difficulty indicating the moment when the symptoms started, during the attacks he may lose consciousness and complain about headaches and convulsions. Attacks are short, lasting a few seconds, but often end in a fall, appear over several months. Ailments intensify, may increase or persist at the same level for a long time, and the movement of the head has very little effect on them. There are many eye symptoms such as blurred vision, scotoma, double vision, and various types of blindness. There is a possibility of symptoms of peripheral and central nervous system damage.

Disturbances in the peripheral syndrome are characterized by a spinning sensation. The beginning is sudden but the patient is able to indicate the start time. Attacks last from several minutes to even several dozen hours. The complaints are greatest at the beginning and gradually disappear, but the patient's head movements may increase them. There is noise and / or a feeling of fullness in the ear, one-sided hearing loss. Ophthalmic disorders appear as an ocular manifestation. May result in paresis or nerve palsy VII. [11]

Another division is differentiation due to the place of damage.
If the damage occurs within the brain, cerebellum or brain stem, possible causes are stroke, multiple sclerosis, meningitis or brain inflammation, a tumor located in the back of the skull, paraneoplastic syndromes and neurodegenerative diseases. Characteristic features are the illusion of instability and vertigo of the nature of centrifugation, spontaneous nystagmus, paresis and impaired sensation, and impaired hearing.

If the damage occurs in the peripheral part of the equilibrium system (internal ear, labyrinth), the possible causes are vestibular neuritis, Méniere disease, post-traumatic condition, and the effect of toxic drugs (aminoglycosides). Characteristic features are systemic dizziness and rhythmic spontaneous nystagmus. If the damage is systemic, patients often misinterpret it as possible causes are endocrine diseases, metabolic disorders, arrhythmias, hypotension, and infections. Characteristic features are the sensation of bewilderment, depression, low response to treatment and variability of symptoms. [9]

Vertigo-types, causes, symptoms

Types of dizziness. There is a distinction between vertigo, the essence of which is the illusion (illusion) of the movement of the environment or of its own body or head. The

person experiencing the systemic return has the impression that everything around her is spinning in a certain direction, it is called. Circular. A completely different type of ailment is called non-systemic dizziness. These complaints lie in the illusion of instability, and they manifest themselves as feelings of uncertainties of attitude, imbalance, and fear of falling. Non-systemic dizziness is a disturbance of spatial conceptions. [14]

According to the above, the breakdown of head disorders can be said to be the result of a complex disorder of the faulty system, which is divided into peripheral and central parts. The peripheral part is an innervation labyrinth, while the central part is the atrium nuclei in the brain stem, cerebeloma, cerebral cortex and their joints.

The sensation of instability and motor uncertainties present in non-systemic disorders may be associated with impaired visual acuity in older age, damage to the musculoskeletal system, such as underweight, slowness of movement or damage to sensation Deep.

The causes of dizziness can be given by multiple divisions: [14,15]
Clinical recognition; Otolaryngological Diseases (Vertigo), diseases of the outer, inner and middle ear (e.g., otitis, Perlak), Méničre's disease, Toxic error caused by poor use of medicines, Vascular damage, Noise and motion sickness, Brain tumor (predominantly nerve VIII), Sclerosis, Migraine, Hypertension, Dizziness following sleep disturbances, Atherosclerosis and Hypoglycemia
Pathogenetic recognition: Bacterial or viral infections of the middle and inner ear, Epilepsy, Migraine, Atrial neopletis-viral disease (most likely herpes virus), Brain and labyrinth injuries, Vascular disorders (transient ischemic attacks, strokes in the posterior cranial cavity), Poisoning caused e.g. Inappropriate use of medicines, Tumors (especially the nerve tumor VIII), Dizziness following sleep disturbances, Anxiety syndromes, depression and other psycho emotional syndromes

Practical shot: Méničre's disease, Atrial nerve inflammation, Brain Injury or Labyrinth, Sclerosis, Poisoning (including unwanted signs of medication), Epilepsy, Migraine and Psychogenic disorders.

Systemic vertigo may be accompanied by nausea, vomiting, which results from damage to the atrial organ and its nerve connections. Non-systemic vertigo-dizziness is accompanied by a lack of stability of the gait or attitude. This type of vertigo develops slowly and can last from a few seconds to many years. There may also be eye swelling, blindfolds or a visual acuity disorder and headache. There is also a feeling of anxiety lasting up to a dozen hours, anxiety and speech disorder.

Diagnostics of balance disorders.
Balance disorders in people with multiple sclerosis may be due to sensations in the lower limbs or dizziness, which result from damage to the brainstem and cerebellum. Properly

carried out diagnostic tests allow for the rapid implementation of treatment. The basic part in the diagnosis of balance disorders in multiple sclerosis is an interview with the patient.

Conversation with the patient.
Information should be obtained about: duration of an imbalance, characteristics of disturbances of the balance, comorbidity with dizziness, trigger factors (eg. migraine, getting up from a sitting position, being in the crowd), occurrence of neurological focal points and hearing loss [16,`7].

Testing of functional activities with imbalances.
There are tests for the functional assessment of a patient with an imbalance. One of them is DGI (Dynamic Gait Index). This is the most popular test for assessing motor functions. The questionnaire was developed by Shymway-Cook. The test is carried out on a distance of 6 meters and includes 24 tasks involving walking at different speeds with head rotation, avoiding obstacles and passing over an obstacle. The advantage of the test is repeatability, low cost and no need to use a specialized test. DGI is a very useful test for people with central disturbances of the equilibrium system [18,19].

The BBS (Berg Balance Scale) test is another test used to assess the functional status of a patient with impaired balance. BBS includes 14 tasks that take 20 minutes. To execute commands you need stairs, 2 chairs, 30 cm ruler and stopwatch. Tasks involve, for example, standing on one leg, standing on both legs, sitting down, climbing stairs and rotating around their own axis. BBS is considered the gold standard for assessing balance [18].

Static-dynamic tests.
Static-dynamic tests, such as the Romberg or Unterberger test, which differentiate balance disturbances caused by CNS disorders with damaged labyrinth are also useful in the diagnosis of balance disorders [16].

Dizziness.
In the situation when the balance disorders coexist with dizziness, the following tests should be carried out: ENT, which consists of a caloric test, ENG and neurological audiometry, which allows to determine whether the patient shows symptoms of focal CNS damage and basic blood test and electrocardiography, which will help to rule out the systemic cause of dizziness. The Dix-Hallpike maneuver allows to exclude BPPV [16,17].

When performing a neurological examination, attention should be paid to focal symptoms from the brain stem and cerebellum (indicative of multiple sclerosis), gait disturbances and nystagmus (in multiple sclerosis there is central nystagmus which is caused by bilateral damage to the cerebellar or its vicinity) [16].

An important diagnostic test is the study of evoked potentials (stem, visual and somatosensory). The demyelination process will be revealed by extended latencies.

When the occurrence of central, or vertical nystagmus and central vertigo is detected, a neuroimaging - magnetic resonance imaging (MRI) should be considered [17].

VNG (videonystagmography) is another important diagnostic method. The test consists in observing the infrared movements of the eye using a video camera and subjecting the results to analysis by a special computer program. VNG is useful for recording and differentiating nystagmus and for analyzing the patient's imbalance [20].

Muscle tension disorders

Increased spastic muscle tone occurs in most MS patients. Spasticity is a movement disorder resulting from damage to the central motor neuron. Stiffness is another form of increased muscle tone. In stiffness, muscle resistance is constant, independent of the speed of stretching, while in spasticity it is typical to increase muscle resistance at faster stretching in the initial phase of movement. The causes of spasticity are not fully explained. It is assumed that it causes damage within the centers responsible for the functions controlling the spinal reflexes, and therefore there is a balance disorder between the mechanisms stimulating and inhibiting the spinal cord motoneurons alpha and gamma spasticity may be of a permanent nature - tonic or phase involving muscle spasms. In tonal spasticity, muscle tone is increased practically without interruption - classically in the lower limbs, mainly in the muscles of the adductor and the flexor of the feet. During the passive movements of the limbs, the penknife symptom can be found. It consists in decreasing the voltage in the final phase of passive motion. In patients who are able to move on their own, this symptom disturbs the pattern of gait, whereas in bedridden patients, it hinders the care activities, favoring the formation of pressure ulcers [21,22].

Spasticity affects the quality of life of patients. Therefore, treatment should be implemented as soon as possible. There are several therapeutic options in the treatment of spasticity, the most common is the use of pharmacotherapy and physiotherapy. Spasticity pharmacotherapy is a difficult and not always successful task, often requiring the use of many drugs. There are mainly drugs modulating ion channels and gamma-aminobutyric acid (GABA, gamma aminobutyric acid) receptors. New drugs used to treat spasticity include modulators of cannabinoid receptors. In the treatment of spasticity, botulinum toxin is also used. As part of physiotherapeutic procedures, patients with elevated muscle tone are used, among others stretching exercises, training with the use of feedback, post-isometric relaxation, stretching and relaxing exercises. Stretching exercises not only reduce spasticity, but also improve muscle flexibility and range of motion in the joints [23,24,25,26].

Balance disorders in MS - therapy

In the therapy of balance disorders and dizziness, various methods of treatment can be used [27]:
symptomatic and causal pharmacotherapy
vestibular rehabilitation
lifestyle change, including changes in diet
surgical treatment (however, it is implemented in a very small number of patients).

Multiple sclerosis is characterized by the occurrence of many clinical symptoms, which primarily affect the quality of life of the patient. Therefore, it is important that the treatment implemented is comprehensive, including pharmacotherapy, psychotherapy as well as physiotherapy [28].

Balance disorders are a significant problem in this group of patients. They appear periodically and suddenly, eg when walking. Among the methods of treating this symptom of MS, physiotherapy brings good effects. The methods used here are: coordination and equivalent exercises, exercises using the posturographic platform [7,29,30].
Balance disorders, both in patients with MS as in other diseases, cause an increased risk of falls. The therapy should include learning the patient's safe fall to minimize the complications associated with falling. Balance disorders are also associated with walking problems. Then, help with locomotion as well as appropriate orthopedic equipment should be provided [30].

9. Discussion

The issues presented by us in this article aim to show the essence of multiple sclerosis, the characteristics of the symptoms of this disease and to familiarize the reader with the main difficulties faced by ill people. It is important to point out that multiple sclerosis should not be treated only as a disability, but as a disease with sets of symptoms possible to alleviate.

People with multiple sclerosis are an extremely large population. It is estimated that in the world the number of these people exceeds 2.5 million, and in Poland it is even 60,000 [3,31,32]. They are struggling with many disadvantages, such as balance disorders, dizziness, abnormal muscle tone, and increased fatigability. Many of these people avoid undertaking physical activity and professional activity due to their unwellness. In addition to physical symptoms, patients are also accompanied by psychological symptoms associated with a significant reduction in self-esteem, a sense of acceptance among others, deterioration of sexual aspects, and even depression occurring in 50% of patients. The same part is struggling with the loss of work, as well as the inability to move independently [3,31].

According to studies by Stachowska et al., Professional activity positively influences the psyche of the sick and their quality of life [31]. Krajewski et al. Studies show that out of 198 people surveyed, 66.7% were not professionally active, and 77.4% of people chose multiple sclerosis in the survey as the leading cause of exclusion from working life [32].

The problem of fatigue in multiple sclerosis is extremely important in the context of physical and occupational activity, which occurs as one of the main manifestations of the disease. It appears after physical activity, even with low intensity, while the time is long. The sick are reluctant to make physical effort, or even exclude him from their lives. It is true that the treatment of fatigue is difficult, however, one should not allow a situation in which physical activity ceases to exist in the patient's life, which is why it is very important to properly adapted to the training program. Consider co-morbidity and

individual patient options. Recommended activities are exercises that include walking training [30,33].

Treatment of multiple sclerosis initially focuses on stopping disease progression and minimizing symptoms. Ultimately, it consists in reducing the negative impact of the disease on the patient's psycho-physical life, and thus improving its quality [31]. Treatment consists, among other things, in taking medication, but a very important part of treatment is also continuous rehabilitation carried out not only in the hospital, but also in the home environment. It first involves acquiring certain skills and then using them in everyday life. Within the scope of rehabilitation, kinesitherapeutic methods such as PNF, NDT Bobath are used to learn proper motor habits, as well as physiotherapy - magnetic stimulation, magnetotherapy, electrotherapy, and thermotherapy [30,34].

Conclusions

Multiple sclerosis is a multifocal disease of central nervous system with unknown etiology and different course, which makes difficulties in treatment. Symptoms of the disease are associated with both motor and non-motor disorders, which in connection with the progressing disease, can lead to disability.

Symptoms of MS are different and we can divide them into three groups: spinal, cerebellar and cerebral. The most common symptoms due to spinal disfunction, are movement disorders, mainly manifested as paresis of one of the limbs, most often spastic paresis. Excessive stretching reflex, positive pathological reflexes, propioception disorders, sphincter dysfunctions are also common disfunctions. Cerebellar demage manifests as a tremor of the lower limbs, limitation of motor coordination and difficulties in alternating movements. A characteristic symptom is the Charcot triad. The rarest cerebral form is manifested by aphasia, convulsions and hemiparesis.

Dizziness and balance disorders may be the first signs of multiple sclerosis. These are subjective feelings that often coexist with other ailments, such as double vision or dysarthria. Balance and coordination disorders are manifested by a feeling of static shaking and disturbances in orientation in space. The attacks are short and it is difficult to determine when the symptoms start. In addition, there may be symptoms associated with visual disturbances such as double vision, dark spots, and also hearing loss. When damage affects the brain, the illusion of instability and systemic dizziness associated with nystagmus, paresis and sensory disorders, and hearing impairment are characteristic.

Vertigo can be differentiated into systemic and non-systemic. The essence of systemic dizziness is the illusion of environmental movement or one's own body or headache. On the other hand, non-systemic dizziness is manifested as posture uncertainty, imbalance or fear of falling. They are often accompanied by an instability of gait or posture.

Imbalances can result from damage to the brain stem and cerebellum and diagnosis is primarily based on an interview with the patient. The duration of imbalance, coexistence of balance disorders with dizziness, hearing loss, features of balance disorders and triggering factors are important to ask during the interview.

Functional activities tests are used to diagnose imbalances. The most popular of these is the DGI (Dynamic Gait Index) test, useful for determining central disturbances of the equilibrium system, which includes 24 tasks. Another is the BBS (Berg Balance Scale) test covering 14 tasks, considered the gold standard for assessing balance. There are also

static-dynamic tests, such as the Romberg or Unterberger tests. In the case of coexistence of balance disorders with dizziness, ENT, ENG tests and neurological anudiometry are performed. The study of evoked potentials (stem, visual and somatosensory) is a helpful diagnostic test revealing the process of demyelination. VNG is a method useful in differentiating and registering nystagmus and in analyzing patient's imbalance.
Increased muscle spasticity occurs in most patients with MS. Stiffness is another forum for increased muscle tone with constant resistance. Tonal spasticity is characterized by an increase in muscle tone practically without interruption. Multi-drug pharmacotherapy is used in spasticity therapy, mainly based on drugs that affect ion channels and GABA receptors. Stretching exercises are used as part of physiotherapy.
The methods used in the therapy of balance disorders and dizziness are pharmacotherapy, vestibular rehabilitation, lifestyle change and surgical treatment.

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