

REVIEW / PRACA POGLĄDOWA

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DIZZINESS IN OLDER PEOPLE**ZAWROTY GŁOWY U OSÓB STARSZYCH**

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S u m m a r y

Dizziness is a very common disorder, and its incidence increases with age. It is a symptom of disorder not the essence of the disease. It is usually the result of disorders of the vestibular system, and can be caused by damage to the labyrinth (vertigo) or its innervation (dizziness). Dizziness deals with two areas of medicine - otolaryngology and neurology. Borderland of these specialties is neurotology, which has been recently considered as a separate specialty. However, it is difficult to diagnose and treat the causes of dizziness and often beyond the otolaryngologist and neurologist close cooperation of other professionals such as:

a cardiologist, ophthalmologist, radiologist, orthopedist, and even a psychiatrist is required. Dizziness is a hardly perceptible symptom and usually very difficult to diagnose. In older persons dizziness occurs due to many different reasons of central, peripheral or psychiatric nature as well as on a background of variety of systemic diseases. Best pharmacological treatment should be started after the appropriate diagnostics and after proper diagnosis. If the cause of dizziness is vestibular system, customized exercise can have a very beneficial effect on the recovery of functional capacity.

S t r e s z c z e n i e

Zawroty głowy to dolegliwość bardzo rozpowszechniona, a ich częstość występowania rośnie wraz z wiekiem. Stanowią one objaw schorzenia, a nie istotę choroby. Są one zazwyczaj wynikiem zaburzeń układu przedsionkowego i mogą być spowodowane uszkodzeniem samego błędnika (zawroty błędnikowe) lub jego unerwienia (zawroty pozabłędnikowe). Zawrotami głowy zajmują się dwie dziedziny medycyny – otolaryngologia i neurologia. Pogranicze tych specjalności stanowi neurootologia, zwana też otoneurologią, która ostatnio uznaje się za odrębną podspecjalność. Ale zdiagnozowanie przyczyn zawrotów głowy oraz ich leczenie jest bardzo trudne i często poza laryngologiem i neurologiem wymaga ścisłej współpracy

innych specjalistów, między innymi: kardiologa, okulisty, radiologa, ortopedy, a nawet psychiatry. Zawroty głowy są trudno uchwytnym objawem i z reguły trudnym do zdiagnozowania. U starszych osób zawroty głowy występują z wielu różnych przyczyn. Mogą być pochodzenia centralnego, obwodowego, psychiatrycznego lub występować na tle różnych chorób ogólnoustrojowych. Leczenie farmakologiczne najlepiej należy rozpocząć po wykonaniu odpowiedniej diagnostyki i po ustaleniu diagnozy. Jeśli przyczyną zawrotów głowy jest układ przedsionkowy, indywidualnie dostosowane ćwiczenia mogą mieć bardzo korzystny wpływ w odzyskiwaniu sprawności funkcjonalnej.

Key words: dizziness, falls, elderly

Słowa kluczowe: zawroty głowy, upadki, osoby starsze

EPIDEMIOLOGY

Dizziness is a disorder frequently occurring in the elderly, which can lead to severe functional deficits. Older people often visit a doctor with non-specific symptoms. The problem increases with age, and it is three times more common in people over 65 years old than in younger adults. Dizziness of different etiologies in the elderly population is a third of the most common reasons for doctor's appointments. In people over the age of 75 years it is even the most common ailment. There are not many epidemiological studies regarding dizziness, and their correct leading is not easy, partly because of the lack of a clear definition of this ailment. In the US, dizziness, both permanent and temporary affects around 8 million people. According to the statistics, in Poland, this problem affects about one million people. According to the German study, it is concluded that one in five adults suffers an episode of dizziness during a year. Some researches show that the majority of patients with dizziness have not been properly diagnosed at the beginning,

Also in the German studies, it is showed that in the tested population 70% of patients came to the doctor with systemic dizziness and 54% with non-systemic dizziness. Benign paroxysmal positional vertigo is the most common form of dizziness and occurs in 1.6% of the adult population – twice as often in women than in men. The annual incidence of BPPV was 0.6%. The second most common form of dizziness is migraine vertigo which affects 1% of the population. [1, 2, 3, 4, 5, 6, 7]

SYMPTOMS

Dizziness is a subjective symptom and it is difficult to determine by the patient and to diagnose by the physician. Dizziness constitutes a very heterogeneous group of disorders. It is often difficult to describe and is interpreted differently by patients. Usually, patients complain of a sense of vertigo, imbalance, instability, environmental spinning, collapsing, swimming, swinging, floating, weakness of lower limbs or a feeling of being drunk.

People who experience dizziness often have the impression of rolling, feel the fear and are confused. Classically it is defined as the occurrence of an illusion of movement, which usually has a rotating component. In some patients who experience dizziness nystagmus

occurs. Therefore, it is difficult to discover the symptoms of the patient on the basis of history.

The variety of symptoms is mainly due to the fact that a balance is related with many systems and factors such as vestibular organ, organ of vision, cerebellar system, proprioception and indirectly cardiovascular system and mental condition of the patient. In the clinical evaluation there are various difficulties that are associated with the subjective assessment of disorders and the degree of their severity. It is difficult to objectify reported symptoms in the study, and it is difficult to objectively assess the effectiveness of treatment (in most cases, it is estimated subjectively by the patient). [1, 5, 8, 9, 10]

There are many divisions of dizziness, which facilitate the classification of symptoms reported by the patient. Symptoms are classified to the groups determined by the most likely etiology of the disease. The division allows a preliminary diagnostics of vertigo.

Dizziness can be divided into systemic and non-systemic. Systemic dizziness is frequently associated with damage of the labyrinth; therefore, the peripheral part of the vestibular system, but rather non-systemic suggest the origin of central vertigo. Systemic dizziness refers to otolaryngology, while the non-systemic is closely related to neurology.

Dizziness can be also divided into central and peripheral. Such a division can be made on the basis of history and physical examination. [1, 2, 9]

In terms of symptoms, the dizziness can be divided into four groups:

- 1) the impression of movement;
- 2) the impression of fainting and weakness;
- 3) imbalance;
- 4) unspecified and difficult to define disorders.

The first group concerns systemic dizziness with the illusion of one's body or the environment movement. The second group is associated with syncope, which is often related with cardiac symptoms. The third group concerns neurological imbalance in the course of ataxia and impaired proprioception, while the fourth group is non-systemic dizziness with unspecified symptoms, dizziness with illusion of postural instability and psychogenic dizziness. [5, 10, 11, 12]

DIFFERENTIAL DIAGNOSIS

Information that have to be considered in the diagnosis of dizziness:

- **duration of dizziness:**

- Seconds (benign paroxysmal positional vertigo, cardiovascular dizziness)
- Minutes (TIA, panic attacks)
- Time (Meniere's disease, migraine)
- Days (inflammation of the vestibular nerve, brain tumor)

- **the nature of dizziness:**

- Systemic (otolaryngological cause)
- Non-systemic (neurological cause)

- **triggers:**

- Orthostatic (postural hypotension)
- Laying in bed and changing position ((benign paroxysmal positional vertigo)
- Sleep deprivation (migraine, epilepsy)
- Presence in public places- open space (panic attacks, psychogenic background)

- **coexisting symptoms:**

- Hearing loss (VIII nerve tumor, Meniere's disease)
- Pain in the ear (otitis media)
- Focal neurological signs (stroke, CNS cancer, multiple sclerosis)
- Consciousness disorders (epilepsy, cardiovascular syncope, stroke)

Differential diagnosis with the use of additional tests:

- neurological examination (if there are any symptoms focal CNS signs);
- otolaryngological examination (otoscopic examination, calorie test, NC, hearing test);
- blood tests (hematology and biochemistry)
- electrocardiography (ECG) in order to exclude systemic causes of dizziness.
- neuroimaging – MRI and CT

In neurological examination, particular attention should be paid to symptoms such as:

- focal signs of brain stem and cerebellum (stroke, cancer)
- abnormal stature reflexes (cerebellar ataxia, extrapyramidal syndromes)
- gait disorders
- nystagmus
- in peripheral lesions: a small, horizontal, increasing by fixation
- in central lesions: high amplitude, in each direction
- ophthalmoplegia- central lesion

- Dix-Hallpike maneuvers - exclusion of BPPV
- unilateral hearing loss (VIII nerve tumor, Meniere's disease)
- static and dynamic tests - Romberg test, Babinski-Wei testl, Unterberger test (with labyrinth damaged during a march in place with eyes closed torsion occurs in the direction of damage). [1, 5, 8, 11, 13, 14, 15]

THE CAUSES OF DIZZINESS

The falls were associated with the most common cause of dizziness, which is benign paroxysmal positional vertigo (BPPV). BPPV can cause a fall, but can also be caused by a fall. Benign paroxysmal positional vertigo is the most common in people aged 60 years and older, but can occur at any age. Apart from aging, there are no specific factors that may increase the risk of benign paroxysmal positional vertigo; however, the damage to the balance system may occur during a head injury but also through various processes and pathological conditions including diabetes, migraine and Meniere's disease.

The feeling of spinning in BPPV is triggered by changing the position of the head, usually in

the morning when moving from a lying or sitting position or at night while falling over in bed. One of the most common causes of this type of dizziness is changing the drug. The most common causes of central dizziness are vascular disorders of the central nervous system, the consequences of injuries (concussion, whiplash injuries), brain tumors, multiple sclerosis, epilepsy, migraine and inflammation of the central nervous system (Ramsay Hunt syndrome-RHS).

The most common causes of peripheral dizziness are benign paroxysmal positional vertigo, Meniere's disease, inflammation of the vestibular neuron (neuronitis vestibularis) and drug-induced vertigo (ototoxic substances).

There are many possible causes of dizziness. Without specific examination it is not possible to determine the cause [1, 2, 5, 16, 17, 18, 19, 20].

ASSESSMENT OF DIZZINESS

The full history of the patient's dizziness is necessary to allow the medical staff to develop the best individual treatment program. Some of the most common questions that should be asked during the examination include: characteristics of dizziness, how long the patient had symptoms, what was the first

incident, what affects the intensification and alleviation of symptoms, if neurological and otolaryngology symptoms occur and what is frequency of incidents. The exact history of physical activity in the past and in the present is also very important. Specific activities of daily living (ADL) can escalate the symptoms. Functional assessment is needed to design a treatment program based on symptoms.

For the evaluation of dizziness, Dizziness Handicap Inventory (DHI) is used. The assessment of this questionnaire is a numerical score, which ranges from 0 to 100. In the DHI, patients evaluate dizziness by their own. The questionnaire contains 25 questions. Every question can be answered with one of the following: "yes" - 4 points, "sometimes" - 2 points, "no" - 0 points. The higher total score, the higher incidence of dizziness occurs. DHI is also used to assess the improvement or lack of progress of therapy. DHI high scores (> 60) have a high association with the occurrence of falls in people with vestibular disorders. [9, 21, 22, 23, 24]

FUNCTIONAL LIMITATIONS

Most patients who experience dizziness reduce their level of activity, even if they have no symptoms. Fear of falling is closely associated with symptoms of dizziness and balance disorders in the elderly. Such people often become much less active because of the fear of the experience of dizziness or imbalance, especially in unfamiliar environment. This passivity drives the vicious circle and begins loss of functionality of the elderly.

Dizziness may severely limit the patient's ability to perform activities of daily living (ADL). Each patient's symptoms may be different, but common symptoms are related to the difficulties in performing fast movements. Movements in this case are understood as activities such as rotating, moving from a lying to sitting position, standing up and walking. Some people can greatly escalate symptoms by moving the head while walking.

Walking with moving the head is often the most difficult thing to do, because the patient is unstable and may feel insecure. Most patients complain of difficulties while watching TV or reading. The patient may experience symptoms while driving both as a driver and a passenger. However, studies show that while driving, the symptoms are less severe when they are drivers. Therefore, in some older people, loss of the

ability to drive can cause serious dilemmas and problems in traveling.

One of the characteristic symptoms in elderly patients with dizziness are problems in walking the corridors of large food stores or shopping centers which is associated with the onslaught of visual information. High-contrast colors and shapes in peripheral vision can result in dizziness, nausea, and headaches in an older person. Individuals with such complaints are forced to limit the amount of time spent outside the home. In fact, dizziness is often associated with agoraphobia and depression. People with agoraphobia, or fear of being in open space and public places, actually avoid leaving the house. This is a problem that can lead to a reduction of the normal daily functioning. Even if there is no dizziness, the stress of its possible occurrence may be sufficient to reduce the daily activity [5, 6, 9, 24, 25].

TREATMENT

Undertaking the treatment of dizziness, the appropriate diagnosis and etiology determination must be performed. The systemic disease should always be previously excluded. We must also remember that the patient's symptoms are subjective and are difficult to objectify and unfortunately, most of drugs have a number of side effects.

In the treatment of dizziness mainly symptomatic treatment should be used. Depending on the determination of the main diagnosis also causal treatment is needed (antiviral drugs, antibiotics, diuretics, steroids, surgery, exercises and maneuvers (BBPV).

The drugs used in the dizziness treatment are defined in pharmacology as antivertiginosa. These are drugs that have different mechanisms of action, and therefore, it is difficult to recommend one particular medication. A patient with severe symptoms of dizziness usually receives prescribed drug therapy, which may reduce the ability of the central nervous system to compensate. Most drugs used to treat the dizziness have an inhibitory effect on the central nervous system and may limit the ability of the central nervous system to adapt to changes caused by imbalances and correct response to rehabilitation.

The best time to lead physiotherapy is when the patient takes small doses of drugs or does not take any at all. However, it should be remembered that some patients are not able to function without any

pharmacological treatment and it is impossible to stop taking medications.

Treatment of dizziness is directed at:

- symptomatic treatment
- causal therapy
- rehabilitation of the consequences of damage to the vestibular system [1, 4, 11, 13, 26].

THERAPY AND REHABILITATION

Not every elderly with dizziness has problems with balance. In terms of symptoms, patients can be divided into three categories: those with vertigo, people with impaired balance, and persons with impaired balance and vertigo. Each of these categories of symptoms should be treated differently in terms of diagnostic and therapeutic.

The treatment program should be based on the patient's functional deficits. During the evaluation of dizziness, it is important to determine if the patient falls and how often falls occur. Also the information what the injuries after a fall were is needed. Falls can lead to the development of post-fall syndrome that significantly contributes to the reduction of physical activity of older people. People with falls in history should be closely monitored at home by family members and an adaptation of residence should be implemented (removal of the external factors that increase the risk of falls).

Treatment of elderly people with dizziness should be supported by rehabilitation. It should be remembered that according to the current opinions, rehabilitation should be started as early as possible, what allows better results. Vestibular rehabilitation is a very important part of the process of treatment in many patients with dizziness, but unfortunately, this view is not sufficiently demonstrated in clinical practice and many doctors do not use enough possibilities of rehabilitation. After the diagnosis, treatment planning should be carried out according to current standards, which include rehabilitation therapy [9, 13, 24, 27, 28, 29].

Discussing the treatment of dizziness it is extremely important that the most common cause of dizziness is benign paroxysmal positional vertigo (BPPV). It is diagnosed and treated with using maneuvers and exercises. For diagnostic the Dix-Hallpike maneuver is used. For the treatment the Brandt-Daroff exercise, Semont and Epley maneuver is used. These maneuvers are easy to make and are

very effective in the treatment. They should be routinely implemented in the procedure in a patient with suspected seizure of dizziness. In patients with BBPV taking medication should not be started without trials of diagnostic and therapeutic maneuvers.

In case of spontaneous dizziness, the habitual exercises are used (muting pathological reactions). Also exercises to improve postural control and spatial orientation should be used. Exercise program for patients with disorders of the vestibular system includes movements, which tend to increase the symptoms. In the course of therapy dizziness is induced. That is why a special attention should be paid (safe environment). It is quite difficult to determine how intense rehabilitation should be, because it depends on individual responses, and often when the therapy is too intensive, the patient may suffer too many symptoms.

In this case the exercise must be stopped. Planning an exercise program it should be remembered to warn the patients that initially and temporarily they feel worse after exercise. If the patient's dizziness maintains for 20 minutes after rehabilitation this means that treatment needs to be verified in terms of intensity and time.

One of the most important components of rehabilitation is regularity of performing prescribed exercise program. If providing therapy at home is a problem then frequency of treatment in ambulatory conditions should be increased. Older people may feel fear of performing the exercises at home, even if home exercise program includes a very detailed instructions for performing it safely. Rehabilitation of the elderly with dizziness is often extended to the recommendation of walking. Walking especially outside the house allows them to become familiar with a variety of visual stimuli. However, it should be noted that this recommendation may not be possible to implement in people living alone, due to the lack of safety and high risk of falling [11, 22, 27, 28, 30].

REFERENCES

1. Prusiński A., Zawroty głowy, Wydawnictwo Lekarskie PZWL 2001.
2. Guccione AA., Geriatric Physical Therapy, Second Edition, Elsevier, Philadelphia 2000.
3. Lampert T., Neuhauser H, Epidemiology of vertigo, migraine and vestibular migraine. *J. Neur.* 2009; 256: 333–338.
4. Baloh R.W. Dizziness in older people. *J. Am. Geriatr. Soc.* 1992; 40: 713–721.

5. Prusiński A., Zawroty głowy w praktyce neurologicznej: obraz kliniczny, diagnostyka, Termedia Wydawnictwa Medyczne, 2010.
6. Latkowski B., Prusiński A. Zawroty głowy (krótkie kompendium). Termedia, Poznań 2009.
7. Neuhauser H.K., Epidemiologie von Schwindelerkrankungen. *Nervenarzt* 2009; 80: 887–894.
8. Tinetti M.E., Williams C.S., Gill T.M. Dizziness among older adults: a possible geriatric syndrome. *Ann. Intern. Med.* 2000; 132: 337–344.
9. Lawson J., Fitzgerald J., Birchall J. et al. Diagnosis of geriatric patients with severe dizziness. *J. Am. Geriatr. Soc.* 1999; 47: 12–17.
10. Pierchała K., Analiza przyczyn zawrotów głowy i zaburzeń równowagi. Biblioteka Prospera Meniere'a 1998; 2: 1–2.
11. Obrębowicz A. (red.), Standardy rozpoznawania i leczenia zawrotów głowy. Oinpharma, Warszawa 2010.
12. Boczarska-Jedynak M., Czechowicz B., Opala G., Zawroty głowy w wieku podeszłym. *Vertigoprofil* 2007; 1: 7–14.
13. Kerber K.A., Enrietto J.A., Jacobson K.M., Baloh R.W., Disequilibrium in older people: a prospective study. *Neurology* 1998; 51: 574–580.
14. Domżał T., Zawroty głowy w praktyce neurologicznej. *Vertigoprofil* 2007; 1: 3–11.
15. Domżał T.M., Zawroty układowe czy nieukładowe? *Vertigoprofil* 2010; 4: 7–13.
16. Pośpiech L., Łagodne napadowe położeniowe zawroty głowy i ich kinezyterapia. *Neur. Prakt.* 2005; 5 (supl. 1/3): 40–45.
17. Epley J.M., New dimensions of benign paroxysmal positional vertigo. *Otolaryngol Head Neck Surg* 88:599-605, 1980.
18. Katsarkas A., Benign paroxysmal positional vertigo (BPPV): idiopathic versus post-traumatic. *Acta Otolaryngol* 119:745-749, 1999.
19. Furman J.M., Cass S.P., *Vestibular Disorders: A Case Study Approach*. Oxford University Press, New York, 2003.
20. Whitney S.L., Marchetti G.F., Morris L.O., Usefulness of the dizziness handicap inventory in the screening for benign paroxysmal positional vertigo. *Otol Neurotol* 26:1027-103, 2005.
21. Jacobson G.P., Newman C.W., The development of the Dizziness Handicap Inventory. *Arch Otolaryngol Head Neck Surg* 116:424-427, 1990.
22. Gębka D., Kędziora-Kornatowska K., Podhorecka M., Zawroty głowy jedną z przyczyn upadków u osób w starszym wieku., *Pielęg. XXI w.* 2012 nr 2 s. 53-56.
23. Sielski G., Kędziora-Kornatowska K., Podhorecka M., Przydatność wybranych skal oceny ryzyka upadków u osób starszych stosowanych w opiece pielęgniarskiej., *Pielęg. XXI w.* 2009 nr 4 s. 85-88.
24. Podhorecka M., Kędziora-Kornatowska K., Sielski G., Zmiany inwolucyjne w układzie ruchu oraz ich konsekwencje wpływające na zmniejszenie aktywności fizycznej osób starszych., *Pielęg. XXI w.* 2011 nr 1 s. 35-38.
25. Furman J.M., Cass S., A practical work up for vertigo. *Contemp Int Med* 7:24-38, 1995.
26. Maarsingh O.R., Dros J., Schellevis F.G. et al, Causes of persistent dizziness in elderly patients in primary care. *Ann. Fam. Med.* 2010; 8: 196–205.
27. Brown K.E., Whitney S.L., Wrisley D.M., Furman J.M., Physical therapy outcomes for persons with bilateral vestibular loss. *Laryngoscope* 111:1812-1817, 2001.
28. Herdman S.J., *Vestibular Rehabilitation*, 2nd edn. FA Davis, Philadelphia, PA, 2000.
29. Whitney S.L., Rossi M.M., Efficacy of vestibular rehabilitation. *Otolaryngol Clin North Am* 33:659-672, 2000.
30. Pośpiech L., Założenia i strategie przedsiomkowej terapii rehabilitacyjnej. *Vertigoprofil* 2009; 3: 2–8.

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