

Dizziness and Falls of the Elderly

L. E. Walther*, H. Schaaf** Th. Nikolaus***, , K. Hörmann**

* HNO-Gemeinschaftspraxis, Main-Taunus Zentrum, Sulzbach (Taunus)

www.hno-praxis-sulzbach.de/

**Ohr und Hörinstitut Hesse(n), Tinnitus Klinik Dr Hesse, Grosse Allee 50, Bad Arolsen

www.tinnitus-klinik.net

***Lehrstuhl für Geriatrie der Universität Ulm, Agaplesion gAG Frankfurt

****Universitätsklinikum Mannheim der Ruprecht-Karls-Universität Heidelberg

Summary

The complaint of dizziness is one of the most common reasons that older adults visit the doctor's office. Because of a growing number of older people in industrialised nations this symptom is increasing. Management of elderly people with vertigo and dizziness needs more than vestibular diagnostics. In addition to sufficient history of the patients, knowledge of visual deficits, extrasensory changes and often of psychological circumstances is necessary. Frequently the indication and the encouragement of vestibular rehabilitation are of significant value and the initiation of a fall prevention may also be essential.

keywords: equilibrium, dizziness, vertigo, falls

Altered Equilibrium at Higher Age

Dizziness in the elderly patient is so common that it is often dismissed as a normal age related phenomenon (Bronstein/Lempert 2006). But getting older is not a sufficient reason for dizziness or falling. Nevertheless, the risks increase because of cumulating diseases and failures of parts of the vestibular system and also because of psychological reasons. Thus morphology changes in the receptors of any component (vestibular, visual, somatosensory system, hearing) in the equilibrium system can be proven with increasing age [Hamann 2007, Walther and Westhofen 2007]. As a consequence, about 60% of female patients and 50% of male patients over 70 report dizziness (Whitney, SL (2000). With patients over 75 vertigo and dizziness represents the most frequent accompanied symptom [Füsgen 1998].

Although dizziness can be caused by many different medical conditions, it is estimated that as much as 45 percent is due to vestibular disorders (Whitney SL 2000). Benign paroxysmal positional vertigo (BPPV) is estimated as the most common and the best treatable cause of vertigo (Ekvall et al (2005, Strupp and Brandt(2008)). The vestibular disorder may be the same as in younger individuals, but the functional sequels may be different and more serious because of the person's comorbid health status.

Often the sum of normal physiological changes and less serious diseases become relevant enough to induce a disturbed integration of vestibular, somatosensory and visual inputs, which can not be compensated by an subsequently slowing down of the motoric system. As a result, minimal changes like new glasses (especially sliding glasses), change in medication and medical side effects, as well as fear or anxiety may lead to a sense of dizziness and increase the risk of falling (Bronstein/Lempert 2006).

With increasing age stable relationships weaken and disappears more and more. For many the fear of loneliness and dependence on others is often more frightening than death itself. This is especially true of the present senior citizens, who survived horrible experiences during world wars, holocaust or

diaspora. During a spell of dizziness or vertigo they experience helplessness and confusion, which induces a memory recall of their past (Schaaf 2007).

Many people can, however, also become victims of anxiety and depression without having experienced negative circumstances earlier. “Threshold situations“ in the second half of the adult life (Heuft et al 2000) are for example retirement, loss of a partner or when of the last child leaves home. In addition, older humans do not remain free of current conflicts, even if they had mastered all requirements and threshold situations in their past life. They can fail at a new, not well learned task, (for example handling isolation and loneliness, when they are no longer needed). Then the diagnosis: old patient – one more somatic disease – is misleading.

Falls

Inactivities, whether caused by lack of motivation, laziness, fear or depression, reactive psychogenic dizziness following vestibular failure like Menière's disease (Schaaf 2000) or orthopaedic, cardiac, neurological morbidities, changes of visus and the insufficient use of sliding eyeglasses can lead to falls (Bronstein/Lempert 2006, [Gazzola et al, 2006](#), [Herdman et al 2000](#)). This, in turn, can induce fear of the next fall, which condones further inactivities. This can become a vicious cycle.

In the field of activity of the ENT doctors falls can occur e.g.

- due to a Benign Paroxysmal Positional Vertigo (BPPV)
- in the acute phase of peripheral-vestibular illnesses like the neuropathia vestibularis,
- in misdiagnosed migraine (Dieterich M, Brandt T(1999))
- during spells of Menière disease
- during Tumarkin's otolithic crisis in the late stage of a disease Menière
- due to an incomplete vestibular compensation, particularly with bilateral equilibrium loss
- as a consequence of inactivities

Diagnostics

As in younger patients the primary goal should be to find the underlying causes of the patient's symptom which may lead to the way to specific treatment. The same approach as with younger patients is meaningful, whereby the view must be extended by the aspects which could affect the vestibular factors and vestibular integration. Relevant amplitude reductions of acoustically induced VEMP or missing of the change of nystagmus while turning patients during bithermal caloric testing along Westhofen (2003) can be used as a sign for a otolithic dysfunction, possibly due to morphology changes (Saccule, nervus vestibularis inferior). [4,7, Bach-y-Rita P, Collins CC, Saunders F, White B, Scadden L (1969, Bronstein/Lempert, 46,51,81]

For the differential diagnosis the circumstance is relevant, whether the fall accompanies with or without Syncope.

Diagnostics of falls

The following standardised and modified function tests are used for estimating the risk of falling in geriatric practice [Nikolaus T (2005). Nikolaus T (2005). Tinetti 2003].

For the examination of the static equilibrium a modified Romeberg attempt is used. It consists of three conditions during while standing with opened eyes and in each case 10 seconds long:

- Both feet parallel next to each other,
- one foot in half length before the other one
- tandem position with one foot before the other “toe to heel”.

Dynamic balance can be examined with a so called „functional reach test”. The person stretches while standing one arm forward at shoulder heights as far as possible without losing equilibrium.

For the collection of the perseverance a „Six-Minute-Walk“ is informative. The test persons are asked to walk six minutes at a normal gait. The distance is measured. With the “Timed UP and Go “- test the person is asked to stand up from a chair, using the arm rests, to walk about three meters, then turn around and finally sit down again [Nikolaus T (2005), Nikolaus T (2005). Tinetti 2003]:

In the mean-time body-fixed movement measures can be used, by which conclusions of the daily activities (going, sitting, lying) can be made. On the basis the three-dimensional movement samples, in particular detailed statements about deficits in the movement motion of the body, can be given.

[Nikolaus T (2005). Nikolaus T (2005).]:

Treatment

Treatment of a patient with dizziness may include - depending upon illness and upon indication:

- Treatment of the specific condition, such as BPPV
- Symptomatic pharmacological treatment of vertigo and associated nausea
- Counselling and reassurance (perhaps also to start with psychotherapy)
- specific vestibular rehabilitation if necessary
- prophylaxis of falls

Benign paroxysmal positional vertigo (BPPV) is estimated as the most common and the best treatable cause of vertigo. However treatment of BPPV can be difficult in the elderly for several reasons. Patients with decreased neck mobility may have problems achieving sufficient head rotation and reclination as required for Epleys manoeuvre. In this case, one can use an examination couch where the head portion can be lowered 30 degrees so that trunk and head are reclined during treatment and further reclination of the head is not required. Alternatively one can apply Semont’s manoeuvre which does not involve any head reclination. On the other hand, frail or obese patients may not be able to cooperate during rapid body swing involved in Semont’s manoeuvre. Then performance becomes easier when a second therapist supports the patient from behind. Finally, cognitive problems and fears of getting dizzy again interfere with understanding and performing self-treatment at home. Therefore, correct execution of the manoeuvre should be checked during consultation and supported by leaflets send along for use at home (Bronstein/Lempert 2006 und Handzettel zum download http://www.charite.de/ch/neuro/klinik/patienten/krankheiten/schwindel_vertigo/englisch_rechts.html).

Despite this challenge, successful treatment will improve substantial mobility of the elderly with contentment for the patient and the doctor.

Pharmacological treatment of acute vestibular disturbances has a symptomatic character in the acute phase of vertigo with spells. A long-term application is contraindicated because of obstructing vestibular compensation, particularly since it promotes the risks of falls by lowering the capacity of reactions.

If anxiety or depression is substantial for the dizziness, it can be meaningful to treat these with antidepressants. In this case the ENT doctor should only use a few antidepressants with minimal side

effects and not hesitate to confer with a psychiatry specialist. As far as known there is no danger that antidepressant interacts unfavourably with the vestibular compensation if an antidepressant medication is able to activate the patient.

Vestibular Rehabilitation

Continuous exercises contribute to the improvement of neuromuscular achievement components, such as coordination and mobility. The view that the central nervous system (CNS) is a static organ, has had to be revised in recent years. Today it is well-known fact that CNS shows a high plasticity even with the aged, and can be stimulated by training. About 50% of falls of the elderly can be avoided with vestibular training. In a word, vestibular training is based upon existing resources and should increase the patient's realistic requirements.

Vestibular training programs cover:

- Arbitrary eye movements and fixations for the improvement of the disturbed gaze stabilization
- Active head movement for new measuring of the vestibulo ocular reflex (VOR).
- Balance- and goal movements and moving exercises for improvement of the vestibulo spinal posture regulation and balance

In order to reach an improvement of the equilibrium system irritating signals are the best stimuli for the brain. Then the equilibrium system is obligated to adjust to them. Therefore it is necessary the exercises should be increased until dizziness is experienced. We primarily use „the classical “ exercises of Cawthorne and Cooksey (1946).

In patients with dysfunctions of the utricle exercises with support in the horizontal plane are preferred. In patients with malfunctions of the saccule exercises in sagittal plane, for example springing on a trampoline (Helling 2008), as well as standing and/or moving on foam material are recommended (Basta/Ernst 2008).

Neuro(bio) feedback system

Vestibular therapy could be augmented since the introduction of neuro(bio-)feedback procedures (Basta und Ernst (2008)). A technical neurofeedback system applies an additional (acoustic, galvanic, vibrotactile) stimulus to the patient while performing vestibular exercises. This stimulus is dependent on the extent of postural deviation of the patient from a normal (ideal) position in space. The neurofeedback system is body worn and continuously registers any postural deviation from the normal position so that it can apply suitable stimuli to the patient.

Especially patients who suffer from restrictions of the sensory perception may profit from additional feedbacks. One disadvantage is that this application is limited to hospitals or centers.

Now it must be proven how long the improvement will last after having finished with neurofeedback (Basta and Ernst (2008)). One should keep in mind that the knowledge won from neurofeedback can be transferred to the 1:1 feedback by a physiotherapist. At present it has not been evaluated whether the factor humans or the factor „equipment “ shows the higher effectiveness.

Fall prevention at the age

The most effective prevention programs contain a strengthening and balance training. Also some “Tai Chi exercises”, can be helpful especially in community group atmosphere. [2x Nikolaus 2005].

The use of hip pads significantly lowers of the hip fractures, particularly with residents in nursing homes . [Nikolaus 2005]. Also simple, but many time not realized precautions such as elevated toilet seats, removed little carpets and other pitfalls for older patients decrease the risk of falling.

Conclusion:

The indistinct term „Presbyvertigo“ describes a complex symptomatology, which contains the various causes and accompaniments of the vestibular system of the elderly. Also, older patients can improve their equilibrium situation themselves, but they often need approval and encouragement for vestibular rehabilitation.

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