Falls and Dizziness in the Elderly

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SUMMARY

The complaint of dizziness is one of the most common reasons that older adults feel constrained to visit the doctor’s office. Because of a growing number of older people in the industrial society the problem grows. Therapeutic process of elderly people with vertigo and dizziness needs more than vestibular diagnostics. In addition to sufficient anamnesis, presence of visual deficits, extrasensory changes and even psychological circumstances are necessary. Frequently the indication and the encouragement of vestibular rehabilitation have significant value. The initiation of fall prevention may also be essential.

*Hasła indeksowe:* zawroty głowy, upadki, rehabilitacja przedsionkowa

*Key words:* vertigo, falls, vestibular rehabilitation

Altered Equilibrium at Higher Age

Dizziness in the elderly patient is so common that it is often called as a normal age related phenomenon [1]. But getting older it is not a sufficient explanation for dizziness or falling. Nevertheless, the risks increase due to the continuation of disease and failure of the part of the vestibular system and also because of psychological reasons. Thus morphologic alteration in the receptors of any component (vestibular, visual, somatosensory system, hearing) in the equilibrium system can be proven with increasing age [2,3]. As a consequence, about 60% of female patients and 40% of males over 70 report dizziness [4]. With patients over 75, vertigo and dizziness represents the most frequent accompanied symptom [5].

Although dizziness can be caused by many different medical conditions, it is estimated that as much as 45 percent is due to vestibular disorders [4]. Benign paroxysmal positional vertigo (BPPV) is considered as the most common and the best treatable cause of vertigo [6, 7]. 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 [1].

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 for current senior citizens, who survived horrible experiences during world wars, holocaust or diaspora. During recurrence of dizziness or vertigo they experience helplessness and confusion, which induces a memory recall of their past [8].

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 [9] are for example retirement, loss of a partner or when the last child leaves home. In addition, older people do not remain free of current conflicts, even if they had mastered all requirements and threshold situations in their past.
They can fail at a new or not well learned task, as coping isolation and loneliness, no longer being needed or the lack of a meaningful task. 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 Menieres disease [10] or orthopaedic, cardiac, neurological morbidities, changes of visus and the insufficient use of sliding eyeglasses can lead to falls [1, 11, 12]. This, in response, can induce fear of the next fall, which leads to 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 [13]
- during attacks of Meniere disease
- during Tumarkin’s otothic crisis in the late stage of a Meniere disease
- 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 finding 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 [14] can be used as a sign for an otothic dysfunction, possibly due to morphology changes (Saccule, nervus vestibularis inferior).

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

Diagnostics of falls

For estimating the risk of falling in geriatric practice course and balance examinations are used with the following standardised and modified function tests [15, 16]. For the examination of the static equilibrium a modified Romeberg attempt is used. It consists of three conditions while standing with opened eyes and in each case 10 seconds long:
- feet parallel to each other,
- one foot a 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 height as far as possible without losing equilibrium.

For the collection of the perseverance a „Six-Minute-Walk” is informative. The tested persons are asked to walk six minutes at a normal gait. The distance is measured. With the „Timed UP and Go” – tested 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 [15, 16].

In the meantime body-fixed movement measures can be used, by which conclusions of the daily activities (going, sitting, lying) can be made. On the basis of the three-dimensional movement samples, in particular detailed statements about deficits in the movement motion of the body can be give [15].

Treatment

Treatment of a patient with dizziness may include, depending upon illness and upon indication:
- treatment of the specific condition, such as BPPV
- symptomatic pharmalogical 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 [17]. 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 an second therapist supports the patient from behind. Finally, cognitive problems and fears of becoming 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. 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 intensive phase of vertigo with attacks. A long-term application is contraindicated due to 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 them 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 psychiatric 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. A clinical algorithm can be taken into consideration for guiding patient care (Fig. 1). The statement that the central nervous system (CNS) is a static organ, has been revised in recent years. Today it is well-known fact that CNS shows a high plasticity even with the age, and can be stimulated by training. About 50% of falls of the elderly could 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 that exercises should be increased until dizziness is experienced. We primarily use „the classical” exercises of Cawthorne and Cooksey [18].

In patients with dysfunctions of the utricle exercises with support in the horizontal plane are preferred. Patients with malfunctions of the saccule, preexercises in sagital plane, for example springing on a trampoline [19], as well as standing and/or moving on foam material are recommended [20].

**Neuro(bio)feedback system**

Vestibular therapy could be augmented since the introduction of neuro(bio)feedback procedures [20]. 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. However, there is one disadvantage. This application is limited to hospitals or centers. Now it must be proven how long the improvement may last after having finished with neurofeedback [20]. 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 (Fig. 2). Also some „Tai Chi exercises”, can be helpful especially in community group atmospheres15 (Fig. 3).

The use of hip pads significantly lowers of the hip fractures, particularly with residents in nursing homes [15]. Also simple, but many times not realized precautions such as elevated toilet seats, removal of 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.

REFERENCES