

CORRESPONDENCE

Gait Disturbances in Old Age—Classification, Diagnosis, and Treatment From a Neurological Perspective

by PD Dr. med. Klaus Jahn, Dr. med. Andreas Zwergal, Dr. med. Roman Schniepp in volume 17/2010

Hyponatremia

In addition to the causes of gait disturbances in old age that were listed in the article I wish to mention another cause of gait disturbances that has hardly received any attention but is clinically highly relevant. Patients with mild chronic hyponatremia fall notably more frequently than patients with normal serum concentrations of sodium. Hyponatremia affects gait more strongly than a blood alcohol concentration of 0.6 g/L. Gait disturbances are reversible after the hyponatremia has been corrected (1). In older patients, hyponatremia is associated with fractures (2). Hyponatremia is twice as common in patients with fractures as in those admitted without fractures.

The cause of the gait disturbance is “hyponatremic encephalopathy,” which is probably the result of a decrease of important, functional, intracellular osmolytes in the brain, such as glutamate and glutamine, in the context of volume adaptation of the brain (3). Further, signs of a reversible decrease in peripheral nerve conduction velocity has been observed in hyponatremia.

According to a large study, 14.5% of patients have hyponatremia on admission to hospital (4). Often this is associated with certain medications. Often, patients develop hyponatremia while receiving treatment with hydrochlorothiazide (HCT), after taking medications that have a neurological effect (antidepressants), or while being treated with carbamazepine.

It is likely that the number of hospital admissions owing to falls could be reduced if we paid more attention to hyponatremia and reacted appropriately. Diagnostic and therapeutic algorithms are available for this purpose.

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REFERENCES

1. Renneboog B, Musch W, Vandemergel X, Manto MU, Decaux G: Mild chronic hyponatremia is associated with falls, unsteadiness, and attention deficits. *Am J Med* 2006; 119(1): 71.e1–8.
2. Ayus JC, Moritz ML: Bone disease as a new complication of hyponatremia: moving beyond brain injury. *Clin J Am Soc Nephrol* 2010; 5(2): 167–8.
3. Verbalis JG, Gullans SR: Hyponatremia causes large sustained reductions in brain content of multiple organic osmolytes in rats. *Brain Res* 1991; 567(2): 274–82.

4. Waikar SS, Mount DB, Curhan GC: Mortality after hospitalization with mild, moderate, and severe hyponatremia. *Am J Med* 2009; 122(9): 857–65.

5. Jahn K, Zwergal A, Schniepp R: Gait disturbances in old age—classification, diagnosis, and treatment from a neurological perspective. *Dtsch Arztebl Int* 2010; 107(17): 306–16.

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Conflict of Interest Statement

In recent years, the author has received honoraria from Otsuka and other companies for scientific studies, lectures, and advisory activities regarding antidiuretic hormone (ADH)-(vasopressin) receptor antagonists, which are used to treat hyponatremia in the syndrome of inappropriate secretion of antidiuretic hormone (SIADH).

Impaired Visual Function

As an ophthalmologist specializing in neuro-ophthalmology, I welcome the wonderfully systematic article about gait disturbances, and especially the mention of bilateral vestibulopathy which is often overlooked. Such patients often present first to their ophthalmologist because they interpret the accompanying oscillopsia as an eye disorder. Examining the different directions of gaze is important in this setting, so as not to overlook nystagmus, which is often hardly noticeable when looking straight ahead.

The authors in their *Table 3* list common gait disorders and their causes; under “Sensory deficits,” however, they mention only “loss of visual acuity”. Visual acuity is defined as spatial resolution capacity of the central retina. In elderly people, visual acuity is most often impaired as a result of age related macular degeneration. If – typically – the visual field is intact, then loss of visual acuity is only rarely the decisive criterion for gait disturbances. Additionally, partial visual rehabilitation by prescribing magnifying visual aids (example under “Therapeutic options”) is of value primarily for near distances because of the massive reduction in the width of the visual field and the change in the perceived distance to the viewed object; it cannot improve spatial orientation and consequently not gait disturbances either.

The term “impaired visual function” would have been more appropriate in table 3 to describe the situations that typically lead to difficulties in orientation in elderly people: primarily, bilateral visual field defects (which cannot always be properly evaluated by a neurologist’ perimetry) owing to chronic glaucoma, bilateral ischemic neuropathy of the optic nerve, and ischemic retinal diseases; further, localization impairments because of eye muscle paresis in the dominant eye; eventually double vision and loss of stereoscopic vision for various reasons—for example, in pathologies

also with intact oculomotor function, such as decompensated phorias, suppression loss in congenital strabismus, and involutive divergence paresis. All these are most likely to be diagnosed and treated by ophthalmologists, possibly in collaboration with an orthoptist.

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REFERENCES

1. Jahn K, Zwergal A, Schniepp R: Gait disturbances in old age—classification, diagnosis, and treatment from a neurological perspective. *Dtsch Arztebl Int* 2010; 107(17): 306–16.

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The author declares that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

In Reply:

Both letters show the importance of an interdisciplinary approach in treating patients with the lead symptoms of gait unsteadiness and dizziness. This particularly applies to elderly patients.

Professor Hensen mentions the importance of hyponatremia as the cause of an unsteady gait and falls in elderly people. Hyponatremia is a common metabolic cause of impaired attention and vigilance. It favors the occurrence of epileptic seizures. Of particular interest is the association of mild chronic hyponatremia with falls. Mild hyponatremia (>125 mmol/L) is often tolerated if it arises as a side effect of treatment with carbamazepine and does not cause any obvious problems. In such patients, the cause of their falls may be metabolic encephalopathy (hyponatremia); the medication (carbamazepine), which potentially causes dizziness; and insufficiently treated epileptic fits. A thorough history (permanent symptoms versus sudden-onset symptoms) and findings on examination (oculomotor disturbances, ataxia) help with differentiation. The literature supports the stringent diagnostic evaluation and treatment of metabolic disorders in patients with gait disturbances.

We are grateful to Dr Neppert for detailing possible ophthalmologic causes of gait unsteadiness in elderly patients. Bilateral vestibulopathy, however, does not cause any problems at rest and will cause symptoms

only when walking or as a result of head movements (1). In the context of ophthalmologic and orthoptists' findings, the disorder can be confirmed by means of the head impulse test and the reading test with blurred vision during head movements (2).

In conclusion, we should mention that in Munich, a so called “integrated research and treatment center is being set up, which will cover the whole subject range of dizziness, oculomotor disturbances, and gait disturbances (3), with financial support from the Federal Ministry of Education and Research (BMBF, the Bundesministerium für Bildung und Forschung). Clinical researchers, basic researchers, and doctors from various specialties (among others: ophthalmologists; neurologists; specialists in ear, nose, and throat medicine; specialists in psychosomatic medicine; specialists in internal medicine; pediatricians) will collaborate in the new center (<http://www.klinikum.uni-muenchen.de/IFB-Schwindel/de/index.html>). This collaboration was set up to obviate the familiar problem caused by the fact that traditional medical specialist disciplines have boundaries that militate against optimal patient care. Patients all too often fall between all the chairs of the traditional disciplines. Research into the diagnostic evaluation and treatment of dizziness and gait disturbances requires the cooperation of all disciplines.

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REFERENCES

1. Zingler VC, Cnyrim C, Jahn K, et al.: Causative factors and epidemiology of bilateral vestibulopathy in 255 patients. *Ann Neurol* 2007; 61: 524–32.
2. Halmagyi GM, Curthoys IS: A clinical sign of canal paresis. *Arch Neurol* 1988; 45: 737–9.
3. Brandt T, Zwergal A, Jahn K, Strupp M: Integriertes Forschungs- und Behandlungszentrum für Schwindel, Gleichgewichts- und Okulomotorikstörungen. *Nervenarzt* 2009; 80: 875–86.
4. Jahn K, Zwergal A, Schniepp R: Gait disturbances in old age—classification, diagnosis, and treatment from a neurological perspective. *Dtsch Arztebl Int* 2010; 107(17): 306–16.

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