

## Vestibular disorders

### Update on diagnosis and treatment

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#### Abstract

*Vertigo* is not a separate disease process, but a multi-sensory and sensorimotor syndrome with various etiologies and pathogeneses. It is among the most common symptoms presented to doctors, with a lifetime prevalence of around 20–30%. Patients have often consulted multiple physicians before a diagnosis is made and therapy can be initiated. A careful history remains the cornerstone of diagnosis. Once the correct diagnosis is made, specific and effective treatments are available for most peripheral, central, and psychogenic forms of dizziness. Treatment may include medication, physiotherapy, and psychotherapy; a few limited cases may require surgical treatment. The treatment of choice for acute vestibular neuritis is the administration of corticosteroids. Ménière's disease is treated with high-dose, long-term betahistine.

#### The common types of dizziness and *vertigo* and their treatment

##### Peripheral vestibular vertigo

A functional classification of peripheral vestibular disorders divides them into three main types, which can be distinguished on the basis of their typical symptoms and signs:

- chronic, bilateral dysfunction of the vestibular nerve or the peripheral vestibular organs;
- acute, unilateral vestibular dysfunction;
- paroxysmal pathological excitation or inhibition of the vestibular nerve or vestibular organs.

##### Benign paroxysmal positioning vertigo (BPPV)

This is the most common type of *vertigo*; it mainly affects older patients and has a lifetime prevalence of 2.4%. It is characterized by brief attacks of rotational *vertigo*, accompanied by vertical positioning nystagmus that rotates toward the lower of the two ears and beats toward the forehead. The attacks are precipitated by repositioning of the head, or by lateral positioning of the head or body, with the affected ear downward. After a change in position of one of these types, rotational *vertigo* and nystagmus arise after a latency of a few seconds and then take a characteristic crescendo-decrescendo course, lasting in total 30–60 seconds. The nystagmus corresponds to a so-called ampullofugal excitation of the affected posterior vertical semicircular canal of the affected ear. More than 90% of cases are idiopathic; the remaining, symptomatic cases are most commonly due to head trauma, vestibular neuritis, or Ménière's disease. BPPV also arises with greater than usual frequency after prolonged bed rest necessitated by other diseases, or after surgery. BPPV of the horizontal semicircular canal is rare and is precipitated by rotation of the head in the recumbent position. BPPV is called

„benign” because it usually resolves spontaneously within a few weeks or months; in some cases, however, it can last for years. If left untreated, it persists in about 30% of patients. The canalolithiasis hypothesis explains all of the manifestations of positioning *vertigo* and nystagmus. According to this hypothesis, the condition is due to the presence of agglomerates of many otoconia that nearly fill the lumen of the semicircular canal and are freely mobile within it. BPPV is treated with positioning maneuvers: rapid repositioning of the head can move the otoconial agglomerate out of the semicircular canal so that it can no longer cause positioning *vertigo*. The treatments of choice are the Semont and Epley maneuvers. Most patients can perform these maneuvers themselves after brief training. The cure rate is more than 95% within a few days, as shown by multiple controlled studies and meta-analyses. The rate of recurrence of BPPV is about 15–30% per year.

##### Vestibular neuritis

The clinical syndrome of vestibular neuritis is characterized by:

- persistent rotational *vertigo* with a pathological inclination of the visual vertical axis toward the side of the affected labyrinth;
- spontaneous, horizontally rotating nystagmus toward the unaffected side, producing apparent movement of the environment („oscillopsia”);
- gait deviation and falling tendency toward the affected side;
- nausea and vomiting;
- unilateral dysfunction of the horizontal semicircular canal, as revealed by the Halmagyi-Curthoys head impulse test for the function of the vestibulo-ocular reflex, as well as by caloric testing.

A viral and/or autoimmune etiology for vestibular neuritis is probable but has not yet been proven. The treatment is symptomatic, causal, and physiotherapeutic:

- symptomatic treatment: antivertiginous medications, such as 100–300 mg of dimenhydrinate in the first three days if necessary to treat severe nausea and vomiting;
- „causal” treatment: methylprednisolone at an initial dose of 100 mg daily, reduced in 20-mg steps every four days, significantly improves the recovery of peripheral vestibular function;
- physical therapy: a further principle of treatment is the promotion of central compensation by physical therapy. Equilibrium training significantly lessens the time required for vestibulospinal compensation and postural regulation to develop.

##### Ménière's disease

This condition is probably due to labyrinthine endolymphatic hydrops with periodic rupturing of the membrane that separates the endolymphatic and perilymphatic spaces. These ruptures precipitate the paroxysmal attacks that last a few minutes to hours. A classic Ménière's attack consists of rotatory *vertigo*, tinnitus, hearing impairment, and pressure sensation in one ear. The lifetime prevalence of this condition is approximately 0.5%. It usu-

**Tabela 2. Badanie przedmiotowe w zawrotach głowy**

Test	Patologia	
Oczopląs spontaniczny P: Obwodowy Z: centralny	P: Ostre jednostronne uszkodzenie przedsionka Z: Pień mózgu/mózdkę	Z: Zaburzenia otolitowe obwodowe i centralne
Z: Odruch oczno-przechyleniowy		Ostre i przewlekłe jednostronne uszkodzenie przedsionka (zawsze obwodowe)
P: Head thrust (HT) dla kanału poziomego		Ostre i przewlekłe jednostronne uszkodzenie przedsionków (zawsze obwodowe)
Z: HT dla kanałów pionowych i otolitów		
<i>Head shaking</i>		
P: Poziomy Ruchy gałek ocznych i <i>vertigo</i> wywołane przez manewry	P: BPPV	Z: <i>Vertigo</i> położeniowe centralne, przetoka, dehisencja kanału górnego
P: Wolne śledzenie i sakkady		Zaburzenia centralne
Z: Skośne sakkady i hamowanie odruchu oczno-przedsionkowego		Przedsionkowe i centralne z zaburzeniami wyższych funkcji mózgowych lub bez takich zaburzeń
Chód		
P: Ocena jakościowa Z: Ocena ilościowa i z zadaniami		

P — podstawowy; Z — zaawansowany; BPPV (*benign paroxysmal positional vertigo*) — łagodne położeniowe zawroty głowy

iting in the check-out line at a store; often, avoidance behavior results. The symptoms typically improve when the patient participates in sports or has had a small amount of alcohol to drink. The affected patients often have an obsessive-compulsive personality, in the sense of „accentuated” personality traits, with a marked tendency toward introspection and a need to „have everything under control”. The central problem in phobic postural *vertigo* is the patient’s attempt to establish conscious control over body equilibrium, which leads to a „spiral of self-observation”. When this happens, the body’s own movements may be perceived as movements of the outside world. The clinical neurological examination and ancillary tests reveal no relevant pathological findings. These patients can be treated with three or four of the following measures: a thorough diagnostic assessment serves to reassure the patient that the symptoms are not caused by an organic disorder; psycho-educative explanation informs the patient about the underlying mechanism of excessive self-observation; desensitization can be perfor-

med by repeated exposure to the precipitating situation(s) and by regular participation in sports; these activities strengthen the patient’s confidence in his or her own balancing ability; finally, if the symptoms persist, pharmacotherapy with a selective serotonin reuptake inhibitor and/or cognitive behavioral therapy can be initiated. Combined therapy according to this approach leads to marked improvement in more than 70% of patients, even if the disorder has been present for many years.

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ally begins on one side, and the frequency of attacks is highly variable. Ménière's disease becomes bilateral in 50% of cases and is the second most common cause of bilateral vestibulopathy. Its treatment is based on two principles:

- treatment of individual attacks: vertigo and nausea can be improved with antivertiginous medications just as in the treatment of other types of acute labyrinthine dysfunction. For example, 100 mg dimenhydrinate suppositories;
- attack prophylaxis: this type of treatment is aimed at improving the underlying endolymphatic hydrops. Despite the high prevalence of Ménière's disease and the large number of clinical studies that have been performed, there is still no treatment of this type that has been conclusively shown to be effective. A beneficial effect on the frequency of attacks has been reported for transtympanic gentamicin and for the prolonged high-dose administration of betahistine hydrochloride (48 mg tid for 12 months).

### Central vestibular syndromes

Central vestibular syndromes are mainly caused by lesions of the vestibular pathways, which arise in the vestibular nuclei in the caudal portion of the brainstem and proceed to the cerebellum, thalamus, and vestibular cortex, or by damage to the vestibulocerebellum. Pathological excitation is a rare cause, as occurs, for example, in the paroxysmal brainstem attacks with ataxia that can be produced by multiple sclerosis or vestibular epilepsy. The common causes of central vestibular vertigo include vestibular migraine and ischemic lesions in the brainstem.

### Vestibular migraine or migraine with vestibular aura

Vestibular migraine is characterized by recurrent attacks that last minutes to hours and usually consist of rotatory vertigo. It is the most common cause of spontaneously occurring attacks of vertigo. Its lifetime prevalence is 0.98%. In more than 60% of patients, these attacks are associated with headache and/or photophobia or phonophobia; the remaining patients have attacks of vertigo alone. Most patients also have migraine attacks with or without an aura; this fact makes the condition easier to diagnose. In some patients, the diagnosis can be made only on the basis of a positive response to the treatment of the individual attacks with medication and to pharmacological prophylaxis. The prophylactic treatment of vestibular migraine is analogous to that of migraine with aura and consists of the administration of beta-blockers, valproic acid, and topiramate. No randomized, controlled studies on the efficacy of medications for vestibular migraine have yet been published.

### Phobic postural vertigo

Phobic postural vertigo is the second most common diagnosis in a specialized neurological ambulatory clinic for dizziness and *vertigo*. This disorder is not found in the diagnostic repertoire of most neurologists and ENT specialists. Patients with phobic postural *vertigo* usually complain of swaying *vertigo*, lightheadedness, and gait unsteadiness that are continually present but fluctuate in severity. These symptoms are often accompanied by anxiety and are situationally dependent. The precipitating factor may be the presence of a large crowd, or wa-

Tabela 1. Kluczowe punkty wywiadu podmiotowego w zawrotach głowy

Choroba	Czas zawrotów	Objawy	Okoliczności
Zapalenie neuronu przedsionkowego	Ostre (< 4 dni)	<i>Vertigo</i> , niestabilność, objawy wegetatywne, oscilopsja	Spontaniczne, pogarszane ruchami głowy
Zapalenie błędnika	Ostre (< 4 dni)	<i>Vertigo</i> , niestabilność, objawy wegetatywne, oscilopsja, niedostuch, szum uszny	Spontaniczne, pogarszane ruchami głowy
Zespół Wallenberga	Ostre (< 4 dni)	<i>Vertigo</i> , niestabilność, zaburzenia postrzegania pionuosclopsja, ataksja, lateropulsja skrzyżowane zaburzenia czucia	Spontaniczne, pogarszane ruchami głowy
Obustronne lub > 3 dni jednostronne uszkodzenie przedsionka	Przewlekłe (> 3 dni)	Przewlekła niestabilność, mierne zawroty, oscilopsja	Prowokowane ruchami głowy, chodem, nasilane w ciemności lub na miękkiej powierzchni
<i>Mal de débarquement</i>	Przewlekłe, niespecyficzne	Kołysanie, bujanie jak na statku	Spontaniczne podczas siedzenia lub leżenia, rzadko podczas ruchu
Lęk/depresja	Przewlekłe, niespecyficzne	<i>Lightheadness</i> , płynanie, kołysanie	Wyoływane ruchami oczu bez ruchu głowy
BPPV	Sekundy	<i>Vertigo</i>	Położeniowe: kładzenie się i siadanie oraz obracanie w łóżku, pochylenie się
Hipotonia ortostatyczna	Sekundy	<i>Lightheadness</i>	Położeniowe: wstawanie
TIA	Minuty	<i>Vertigo</i> , <i>lightheadness</i> , niestabilność	Spontaniczne
Migrena	Minuty	<i>Vertigo</i> , <i>dizziness</i> , choroba lokomocyjna	Spontaniczne i prowokowane ruchem
Napad paniki	Minuty	Niespecyficzne zawroty, nudności, poty, strach, tachykardia, parestezje	Spontaniczne lub sytuacyjne
Choroba Ménière'a	Godziny	<i>Vertigo</i> , niestabilność, pełność/niedostuch	Spontaniczne, nasilane ruchami głowy

BPPV (*benign proximal positional vertigo*) — łagodne położeniowe zawroty głowy; TIA (*transient ischemic attack*) — przemijający atak niedokrwieniowy