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Classification, diagnostic criteria and management of benign paroxysmal positional vertigo

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ABSTRACT

Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vertigo and the posterior and/or lateral semicircular canals are usually affected. BPPV is characterized by brief attacks of rotatory vertigo associated with positional and/or positioning nystagmus, which are elicited by specific head positions or changes in head position relative to gravity. In patients with the posterior-canal-type of BPPV, torsional nystagmus is induced by the Dix–Hallpike maneuver. In patients with the lateral-canal-type of BPPV, horizontal geotropic or apogeotropic nystagmus is induced by the supine roll test. The pathophysiology of BPPV is canalolithiasis comprising free-floating otoconial debris within the endolymph of a semicircular canal, or cupulolithiasis comprising otoconial debris adherent to the cupula. The observation of positional and/or positioning nystagmus is essential for the diagnosis of BPPV. BPPV is treated with the canalith repositioning procedure (CRP). Through a series of head position changes, the CRP moves otoconial debris from the affected semicircular canal to the utricle. In this review, we provide the classification, diagnostic criteria, and examinations for the diagnosis, and specific and non-specific treatments of BPPV in accordance with the Japanese practical guidelines on BPPV published by the Japan Society for Equilibrium Research.

1. Introduction

Robert Bárány first described positional vertigo in 1921 [1] and the term ‘‘benign paroxysmal positional vertigo’’ (BPPV) was coined by Dix and Hallpike in 1952 [2]. Currently, BPPV is the mostcommon peripheral cause of vertigo. In most patients, BPPV is characterized by brief attacks of rotatory vertigo with torsional positioning nystagmus, which are elicited by changes in the head position relative to gravity. Because their posterior semicircular canal is affected, posterior-canal-type of BPPV is diagnosed. In 1985, McClure first reported lateral-canal-type of BPPV, in which the lateral semicircular canal was affected [3]. A direction-changing geotropic or apogeotropic positional nystagmus is elicited when the head of the patient, with lateral-canal-type of BPPV, is rolled from side to side on supine position.

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Dix and Hallpike also suggested that BPPV was caused by a lesion of the otolith organ [2]. On postmortem examination of the temporal bones, Schuknecht then reasoned that the otoconia released from the otolithic membrane settled on the cupula (cupulolithiasis) and that the cupula would respond to gravity [4]. Hall et al. later hypothesized that the otoconial debris floats freely within the endolymph of the semicircular canal (canalolithiasis) [5]. Recently the canalolithiasis theory has drawn a lot of attention related to the canalith repositioning procedure (CRP) for the treatment of BPPV.

In this review, we provide the classification, diagnostic criteria, and examinations for diagnosis and specific and non-specific treatments of BPPV in accordance with the Japanese practical guidelines on BPPV published by the Japan Society for Equilibrium Research [6].

2. Diagnostic criteria for BPPV

Posterior-canal-type of BPPV (canalolithiasis)

A. Symptoms
1. Attacks of rotatory vertigo or dizziness are induced by changes in the head position relative to gravity.
2. The vertigo appears with short latency, lasts for less than a minute and is characterized by an increase followed by a decrease in its intensity.
3. The intensity of the vertigo decreases or disappears after repeated head positioning.
4. The vertigo is not associated with any cochlear symptoms such as hearing loss, tinnitus, or ear fullness.
5. There are no neurologic symptoms other than vertigo.

B. Signs
1. Torsional nystagmus, in which the upper pole of the eye rotates toward the affected ear, is induced by the Dix–Hallpike maneuver where the patient is brought from the upright to supine position with the head turned 45° to the affected ear. The nystagmus often contains an additional vertical (upward) component.
2. Torsional nystagmus, in which the upper pole of the eye rotates toward the contralateral ear, is then induced by the reverse Dix–Hallpike maneuver where the patient is brought from the supine to upright position. The nystagmus often contains an additional vertical (downward) component.
3. The nystagmus appears with short latency, lasts for less than a minute and is characterized by an increase followed by a decrease in its intensity.
4. Other peripheral and central vestibular diseases causing vertigo are excluded.

Diagnostic categories

Definite posterior-canal-type of BPPV (canalolithiasis)
To meet all the points in criteria A and B.
Probable BPPV
To meet all the points in criteria A in the history, but no observable nystagmus and no vertigo with any positional or positioning maneuver, probably because the BPPV is resolved spontaneously.
Atypical BPPV
To meet all the points in criteria A and point 4 in criteria B, but not any of points 1–3 in criteria B.
Note: The atypical BPPV consists of the anterior-canal-type of BPPV (canalolithiasis), the posterior-canal-type of BPPV (cupulolithiasis), and the multiple-canals-type of BPPV.

Lateral-canal-type of BPPV (canalolithiasis)

A. Symptoms
1. Attacks of rotatory vertigo or dizziness are induced by changes in the head position relative to gravity.
2. The vertigo appears with short latency, lasts for less than a minute and is characterized by an increase followed by a decrease in its intensity.
3. The intensity of the vertigo decreases after repeated head positioning.
4. The vertigo is not associated with any cochlear symptoms such as hearing loss, tinnitus, or ear fullness.
5. There are no neurologic symptoms other than vertigo.

B. Signs
1. Geotropic positional nystagmus is induced by the supine roll test: rightward horizontal nystagmus is induced by the right-ear-down head position and leftward horizontal nystagmus is induced by the left-ear-down head position with the patient supine. The nystagmus consists of major horizontal and minor torsional components.
2. The nystagmus appears with short latency, lasts for less than a minute and is characterized by an increase followed by a decrease in its intensity.
3. Other peripheral and central vestibular diseases causing vertigo are excluded.

Diagnostic categories

Definite lateral-canal-type of BPPV (canalolithiasis)
To meet all the points in criteria A and B.
Probable BPPV
To meet all the points in criteria A in the history, but no observable nystagmus and no vertigo with any positional or positioning maneuver, probably because the BPPV is resolved spontaneously.
Atypical BPPV
To meet all the points in criteria A and point 3 in criteria B but not any of points 1 and 2 in criteria B.
Note: The atypical BPPV consists of the anterior-canal-type of BPPV (canalolithiasis), the posterior-canal-type of BPPV (cupulolithiasis), and the multiple-canals-type of BPPV.

Lateral-canal-type of BPPV (cupulolithiasis)

A. Symptoms
1. Attacks of rotatory vertigo or dizziness are induced by specific head positions.
2. The vertigo appears without latency and lasts for more than a minute without any decrease in its intensity.

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