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EVALUATION OF THE RELEVANCE OF CEPHALIC MANEUVERS IN THE DIAGNOSIS AND TREATMENT OF BENIGN PAROXYSMAL POSITIONAL VERTIGO

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ABSTRACT

Objectives: The present study aims to describe the main mechanisms of therapeutic maneuvers used in the treatment of Benign Paroxysmal Positional Vertigo (BPPV), with emphasis on the procedures for performing the primary maneuvers used in clinical practice. In addition, this review seeks to elucidate how the precise identification of the affected semicircular canal and the proper application of these maneuvers contributes to the resolution of symptoms, the prevention of recurrences, and the minimization of the functional limitations imposed by vertigo. The study also reviews the etiological factors and subtypes of the pathology, offering an updated perspective on its pathophysiology and clinical management.

Results: the results of the study indicate that BPPV affects women more frequently, with the right labyrinth as the main site of involvement, with emphasis on the posterior semicircular canal. Risk factors for the development of the pathology include arterial hypertension, diabetes mellitus, osteoporosis, and vitamin D deficiency. The recurrence rate of BPPV is high, which reinforces the importance of an accurate diagnosis, based on a thorough clinical evaluation, with emphasis on the Dix-Hallpike maneuver, considered the gold standard for the identification of characteristic nystagmus. Regarding treatment, therapeutic maneuvers proved to be effective, especially those of head movement. The repositioning maneuver was able to control the nystagmus and solve the symptoms, especially in cases of unilateral involvement of the posterior canal.

Conclusion: Appropriate diagnosis and treatment of BPPV are crucial for improving patients' quality of life, preventing falls, and reducing limitations in daily activities. Although vertigo is of brief duration, it has a considerable functional outcome. Thus, the precise identification of the affected canal and the application of the pertinent therapeutic maneuver are essential. The study emphasizes the need for greater attention to the nuances of diagnostic and therapeutic maneuvers, with the aim of ensuring efficient management of BPPV.

Keywords: Vertigo. Nystagmus. Diagnosis. Treatment.

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Revista ARACÊ
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INTRODUCTION

Benign Paroxysmal Positional Vertigo - BPPV is a mechanical disorder of the peripheral vestibular system, characterized mainly by episodes of vertigo of brief duration, triggered by changes in certain positions of the patient's head (BHATTACHARYYA, 2017; KIM, Hyo-Jung, 2020). Additional symptoms commonly associated with the symptoms mentioned above are nausea, vomiting, and even presyncope. BPPV is the main cause of vertigo in the world and is the main complaint of approximately 24.1% of otorhinolaryngological visits and can even reach 36-45% of complaints in the elderly population (BHATTACHARYYA, 2017; POWER, Laura, 2020). In addition, BPPV is more prevalent in females, with a predominance of the posterior semicircular canals (OLIVEIRA, 2020). Diagnosed patients often have comorbidities and associated audiological symptoms. The recurrence rate of the disease is high and its incidence increases proportionally with age, which makes episodes in children extremely rare (KIM, Hyo-Jung, 2020). This high percentage of occurrence is justified by the significant impact of symptoms on the patient's quality of life, even though it is a benign pathology. For this reason, follow-up is essential, even after performing the repositioning maneuvers.

The etiology of primary BPPV is not completely defined, and is permeated by two main theories, canalolithiasis and cupulolithiasis. The theory of cupulolithiasis was proposed by Schuknecht in 1969, based on anatomopathological findings of basophilic deposits adhered to the dome of the semicircular canal in patients with BPPV symptoms (KIM, Hyo-Jung, 2020; Oliveira, 2020). This theory was argued in the fact that these basophilic deposits, by the action of gravity, would detach from the macula of the utricle and be deposited in the dome of the posterior semicircular canal.

Another explanation was proposed by Hall in 1979, called the canalolithiasis theory. This theory also admits that otoconia displacement is an initial pathogenetic factor, being more common in the elderly due to the progressive reduction in the number and volume of otoliths throughout life (BALATSOURAS, 2018). However, unlike the cupulolithiasis theory, it admits that calcium carbonate fragments that detach from the macula float freely in the endolymph. It is understood that Hall's theory best explains the fatigability observed, resulting from the dispersion of otoconia in the endolymphatic fluid.

Within the general classification of BPPV, there are different subtypes, such as the Posterior Semicircular Canal and the Lateral Semicircular Canal, and it is essential to

Revista ARACÊ
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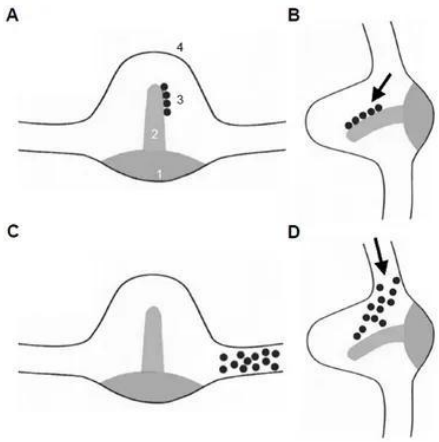
identify the affected canal to direct the management and treatment of the patient (PING, Lin, 2022).

Benign Paroxysmal Positional Vertigo (BPPV) can be triggered by traumatic brain injury, vertebrobasilar insufficiency, post-otological surgery, endolymphatic dropsy, vestibular neuritis, and middle ear diseases (OLIVEIRA, 2020). In addition, other factors seem to predispose to its development, such as advanced age, cervical or cranial trauma, physical inactivity, neck pain, and history of diseases or ear surgeries. The diagnosis of BPPV is based on a detailed clinical evaluation, including analysis of the history of vertigo, especially when associated with changes in head position. Diagnostic confirmation is performed by means of the Dix-Hallpike maneuver, which allows the identification of nystagmus characteristic of the disease.

In this sense, the present study aims to describe the mechanism of execution and the relevance of the main maneuvers for the treatment of BPPV, as well as to emphasize the importance of this and a complete diagnosis in the patient's quality of life.

Image 1. In A and B it represents the theory of cupulolithiasis. In C and D, they present the canalolithiasis theory.



Source: Balatsouras DG, Koukoutsis G, Fassolis A, Moukos A, Apris A. Benign paroxysmal positional vertigo in the elderly: Current insights. Clin Interv Aging. 2018; 13:2251–6

METHODOLOGY

This study was based on a systematic review of the literature carried out through the digital databases Portal Capes, Scielo and PubMed, using the descriptors in health sciences (DeCS) for the search: "Vertigo", "Nystagmus", "Diagnosis", "Treatment". A total of 27 articles were found, among these, 10 were selected for analysis of the results and for the construction of data research. The main exclusion criterion was the date of publication,

Revista ARACÊ
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and those published before 2012 were not selected. Language was the inclusion criterion, and only articles that were presented in English or Portuguese were selected.

RESULTS

BPPV predominates in females and mostly affects the right labyrinth (BALATSOURAS, 2018). Risk factors for the development of the pathology are systemic arterial hypertension, diabetes mellitus, osteoporosis, vitamin D deficiency, and hyperlipidemia (OLIVEIRA, 2020).

It is important to emphasize that about 90% of patients with this pathology have involvement of the posterior semicircular canal and, in most cases, the involvement is unilateral (BHATTACHARYYA, 2017). The diagnosis can be defined through anamnesis, associated with complementary tests. Among them, pure tone audiometry, brainstem audiometry, and nystagmography can be performed in order to rule out otoneurological pathologies capable of triggering secondary nystagmus.

The cephalic maneuvers have the purpose of concluding the diagnosis of BPPV, and are useful in determining the semicircular canal affected. Among these, the Dix-Hallpike maneuver is considered the gold standard. This is capable of inducing nystagmus, and consists of positioning the patient sitting on the stretcher, with the legs stretched out, and then rotating the patient's head by 45 degrees, towards the direction of the canal to be examined. The final moment consists of, in this position, laying the patient down so that his head is 30 degrees hanging from the stretcher, and observing the presence of nystagmus (UZ, Uzdan, 2019). If positive, the presence of nystagmus will be mostly visible on the side of the affected canal and, in addition, the direction of the nystagmus indicates the semicircular canal affected. If the pathology is based on the posterior semicircular canal, the nystagmus presented will be rotational and vertical.

In addition to the Dix-Hallpike maneuver, the Pagnini-McClure maneuver is responsible for investigating BPPV in lateral semicircular canals. The maneuver consists of positioning the patient in the supine position on the stretcher, with the head flexed at about 30° by the examiner, in order to align the lateral canals with the gravitational axis. At this point, a rapid rotation is performed with the patient's head to one side, following the triggering of horizontal nystagmus and a sensation of vertigo. The rotation to the same side is maintained until the response ceases, and then the examiner returns the patient's head to the initial position slowly, to repeat the process to the other side (POWER, Laura, 2020).

Revista ARACÊ
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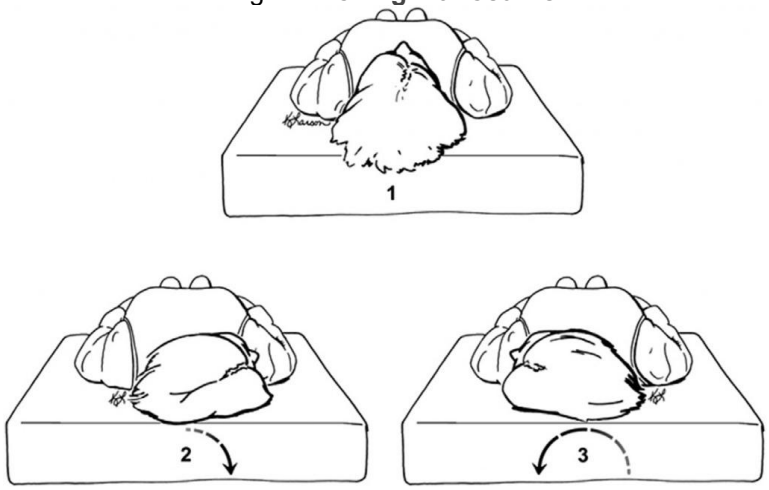
In the above-mentioned examination for lateral channel BPPV, the examiner will find horizontal nystagmus (geotropic or ageotropic), with very short latency, paroxysmal and non-fatigued with movement. Such responses occur with the movement of the head to both sides (POWER, Laura, 2020).

Image 2. **Rolling manoeuvre.**



Source: FIFE, Terry D.; VON BREVERN, Michael. Benign paroxysmal positional vertigo in the acute care setting. Neurologic clinics, v. 33, n. 3, p. 601-617, 2015.

DISCUSSION

From the pathophysiological theories discussed, canalolithiasis stands out as the most widely accepted model today, as it better explains the typical fatigability observed in BPPV, as proposed by Hall (1979) and reinforced by Kim et al. (2020). The presence of comorbidities such as hypertension, diabetes mellitus, osteoporosis, and vitamin D deficiency, pointed out in this study, has also been associated with increased incidence and recurrence of BPPV, especially in older patients (BALATSOURAS et al., 2018; POWER et al., 2020).

Regarding the diagnosis, the Dix-Hallpike maneuver is correctly recognized as the gold standard for identifying posterior canal BPPV, while the Pagnini-McClure maneuver plays a crucial role in the investigation of lateral canal BPPV (DE CARVALHO, 2015). Both maneuvers are essential for differentiating between the subtypes of the disease, enabling a more targeted and effective treatment (PING et al., 2022).

Regarding treatment, the importance of head movement maneuvers as the main methods is highlighted. BPPV with posterior involvement can be controlled with approximately two maneuvers. Bilateral or multi-channel maneuvers, on the other hand,

Revista ARACÊ
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require a greater number of maneuvers. These methods are efficient, especially for the disappearance of nystagmus and control of the pathophysiology involved.

CONCLUSION

Therefore, the diagnosis and appropriate management of patients with BPPV are essential to increase their quality of life, as well as to prevent accidents. Despite the short duration of vertigo, mostly less than one minute, it is known that the pathology is associated with the limitation in performing routine activities, for fear of BPPV triggering accidents.

The need for a study on the subtle differences presented in diagnostic and treatment maneuvers is also emphasized. In this sense, the affected root canal can be correctly identified and, finally, treated.

Revista ARACÊ
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