Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XVI, ISSUE 1, 2016, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengace Learning, Cabell's Directories

Science, Movement and Health, Vol. XVI, ISSUE 1, 2016
January 2016, 16 (1): 54-58
Original article

PHOBIC POSTURAL VERTIGO

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Abstract

Aim: Phobic postural vertigo (PPV) is the most common cause of chronic dizziness in middle-aged patients. Many patients report symptoms involving gait, is characterized by subjective dizziness and disturbance of balance and is one of the most frequent causes of chronic dizziness

Methods: 20 patients with PPV (men compared with women) were clinical evaluated-gait and anxiety evaluated.

Results: After normal walking, eye closed walking and obstacle walking we evaluate capacity of the patients to walk between 2 groups (men/women) and the results revealed a significant reduction of walking speeds in PPV patients under the conditions of walking over the obstacle at women with increasing of fear sensation.

Conclusions: PPV patients show characteristic gait alterations: a reduced gait speed and vertigo on obstacle walking in special at women. This changes correlate with the patients' subjective fear of falling. Moreover, dual-task and eyes closed walking paradigms suggest that walking in PPV patients is characterized by an increased attention control and a higher reliance on visual imput, similar with obstacle walking.

Key words: Phobic postural vertigo, gait, anxiety, rehabilitation

Introduction

Phobic postural vertigo (PPV) is the most common cause of chronic dizziness in middle-aged patients. Many patients report symptoms involving gait, is characterized by subjective dizziness and disturbance of balance and is one of the most frequent causes of chronic dizziness (Best et al., 2006; Eckhardt-Henn A et al., 2003).

The majority of PPV patients report having balance disturbances, mainly while walking and standing, with exacerbation during perceptional stimuli (e.g., walking on a bridge, walking stairs, walking in empty rooms) and during social situations (crowds etc). Typically, PPV follows a period of particular emotional stress or vestibular or non-vestibular illness, little is known about changes in gait control of these patients.

The aim of this study was to determine role of anxiety associate with PPV and to evaluate whether obstacle in walking are associated with their subjective imbalance and fear of falling.

Methods

20 patients with PPV (10 women; mean age 51 ± 13 years; mean height: 1.65 ± 0.13m; and 10 men; mean age 55 ± 12 years; mean height: 1.75 ± 0.12m; The diagnosis of PPV was based on the diagnosed criteria proposed by Brandt (Best, 1996). All observed patients were hospitalized in Clinical Hospital of Constanta, between 01.01.2014-31.12.2015.

All patients completed the Falls Efficacy Scale-International (FES-I) and the Activity-specific Balance Confidence Scale (ABC). The FES-I compares 16 questions on the subjective fall efficacy in daily life situations. A total score is obtained by adding the scores (1 – 4) of each question. That will give a range from 16 (no concerns about falling) to 64 (severe concerns about falling) points. The ABC is a self-reported questionnaire of 16 questions evaluating the subject's level of self-confidence in daily mobility situations.

Results

After normal walking, eye closed walking and obstacle walking we evaluate capacity of the patients to walk between 2 groups (men/women) and the results revealed a significant reduction of walking speeds in PPV patients under the conditions of walking over the obstacle at women with increasing of fear sensation.

Characteristics of the enrolled subjects

Basic demographics and patient characteristics are summarized in Table 1. The PPV cohort had a mean age of 49 ± 15 years and a mean duration of symptoms of 47 months (range 2; 180). Six patients showed a secondary form of PPV, i.e., an episode of vertigo or dizziness preceded the PPV symptoms (Table 1). Seventeen

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Received 22.09.2015 / Accepted 16.10.2015

of the 18 patients with a primary PPV course reported that an unspecific situation or stress or a non-vestibular disease preceded the symptoms.

Table 1 Demographic and clinical data of the enrolled subjects

PPV	Men	Women
Gender female/male	10	10
Mean age in years	51	55
Mean duration of symptoms in months	24	24

Anxiety during balance situations was reported or admitted on direct questioning by 20 patients, men more than women whereas vegetative symptoms such as palpitations, sweating, fear or nausea, intestinal trouble were present in 20 patients.
15 patients had no history of falls in the previous 3 months.

Gait characteristics of PPV patients

Normal walking testing revealed a significant reduction of walking speeds in PPV patients under the conditions of walking at slow speed and walking at maximum speed did not reveal a significant difference in walking speed between the two groups.

Walking with eyes closed also revealed parallel changes in the walking patterns PPV patients: walking speed was reduced with a decrease in cadence and stride length and an increase in gate cycle parameters (stride time) and gait variability.

The whole experiment consisted of two blocks of trials each consisting of 40 steps over the obstacles (i.e., 20 obstacle steps with each leg). Between the two blocks the subjects had a break of 10 minutes.

We evaluated:

- Normal gait of the patients with falling on Normal walking, normal walking rapid, turn left rapid, turn right rapid, short steps, short steps rapid. We used gait tasks known to provoke falling, such as rapid 360º turns and walking with steps smaller than the self-preferred step length.

Table 2: Falling and anxiety at PPV patients

		Nr of falling men	Nr of falling women	Anxiety men	Anxiety women
Normal walking rapid	20	8	12	7	13
Turn left rapid	20	7	13	5	15
Turn right rapid	20	5	15	6	14
Short steps	20	6	14	5	15
Short steps rapid	20	9	11	6	14

Results revealed a significant reduction of walking speeds in PPV patients under the conditions of walking over the obstacle at women with increasing of fear sensation.

Some PPV subjects were only able to perform the experiment by holding onto the parallel bars, leading to reduced balance demands. A separate examination revealed a similar improvement in foot clearance and

number of obstacle hits compared to the PPV subjects with freely moving arms.

Discussions

Phobic postural vertigo is a subjective postural dizziness and imbalance that takes a chronic course, lasting at least for a period of weeks to months.

Often it occurs with short exacerbations triggered by all type of stimulation (head movements, social situations, or visual motion). It improves with sport activities or small amount of alcohol.

Neurological tests are normal in dissociation with clinical sensations of the patients.

Bilateral vestibulopathy is also a chronic condition. Its most common symptom is unsteadiness of posture and gait, especially in the dark and on unlevel groundand and there are no neurological deficits.

Other neurological disorders that manifest with postural imbalance such as progressive or polyneuropathy, Parkinson disease, supranuclear palsy, normal pressure hydrocephalus, are not described here because their diagnosis is based on additional „non-vestibular" neurological signs and symptoms.

Our study tried to determine the role of exercise as a psychological support for patients with PPV.

The gait of PPV patients is characterized by a reduction of walking speed which correlates with the fear of falling and dual tasks experiments reveal a higher attention demand for the gait task in PPV patients.

Therefore, the aim of this study was to investigate the acquisition and performance of a more complex obstacle stepping task in PPV patients.

Our main findings are as follows:

1. The gait of PPV patients is characterized by a reduction of walking speed which correlates with the fear of falling depending of number of obstacle and the anxiety associated.

2. PPV patients rely more on visual feedback while walking.

The most prominent change in the walking pattern of PPV patients was a reduction of walking speed during slow and preferred walking;

An alternative explanation for the reduction of walking speed in PPV patients can be extracted from the concept of "cautious gait", an established term in the field of geriatric gait research (Gilady, 2005).

"Cautious gait" is typically marked by mild to moderate slowing reduced stride length and mild widening of the base of support (Nutt et al., 1993).

Anxiety-related factors and the fear of falling are major contributors to a cautious gait. Some authors also state that a reduction of the walking speed increases the possibility for conscious gait control (Aizen, 2001).

Correlation analysis in our PPV cohort supports this theory; PPV patients showed significant correlations between gait speed reduction and the subjective fear of falling (FES-I) and the scores for balance confidence (ABC).

In contrast to patients with vestibular deficits (e.g. bilateral vestibular loss) (Schniepp, 2012) or patients with cerebellar disorders (Wuehr, 2013), we found normal values of temporal and spatial gait variability parameters in PPV patients. Gait variability which represents the stride-to-stride fluctuations of the walking behavior is a useful marker of dynamic stability during gait (Hausdorff, 2005).

The distinct characteristics of gait variability in PPV patients on one side and somatic dizziness entities on the other side might be used in the differential diagnosis in patients with chronic dizziness during stance and gait.

Gait variability measurements might be helpful in geriatric balance centers where gait analysis is more widely used than neuro-otological testing procedures (e.g. caloric testing of vestibular function).

A current concept of postural control is that it shares attentional resources with cognition (Kerr, 1985).

Dual task paradigms, employing walking and cognitive tasks simultaneously, have been used to shed light on motor and cognitive interference with gait (Woollacott, 2002).

Whereas the decrement of gait quality in our study was similar for PPV women and men (indicated by comparable VR in both groups), we found significant differences in the performance of the second, non-postural task; PPV patients showed a reduced cognitive processing speed under DTc, which denotes a disturbed dual task capacity in these patients.

Changes of the non-postural task in DTc paradigms can be considered to indirectly reflect the attentional demands of posture, (Ebersbach, 1995) which would then support the hypothesis that PPV patients pay more attention to gait control than do HS.

On the other hand, one could argue that the obsessive-compulsive personality of a PPV patient per se could have influenced the performance of a cognitive task and that the reduced processing speed is not specific for dual task situations.

This is unlikely, as the clinical contact with PPV patients does not support the idea of a general reduced cognitive processing speed. However, it cannot be ruled out completely, since the current study lacks a control condition with a cognitive single task.

To educate this aspect, future studies should include comprehensive single and dual task conditions in order to further investigate additional demands of gait control in PPV patients.

Decrements of cognitive rather than postural tasks yield information on the prioritization of tasks in DTc situations.

Although the PPV patients were instructed to give priority to the cognitive task, the patients rather focused on good postural control instead of a good performance of the cognitive task.

Thus, the main focus of PPV patients lies on the maintenance of postural stability, which might explain why they do not actually fall despite their high scores for fear of falling.

Walking with eyes closed revealed a pronounced reduction of walking speed and higher individual VR in PPV patients, and obstacle revealed a significant reduction of walking speeds in PPV patients under the conditions of walking over the obstacles at men with increasing of fear sensation.

This indicates that PPV patients rely more on visual imputes during walking than do HS, a fact that agrees with the concept of visual vertigo (Bronstein, 1995).

This phenomenon was independent from the duration of symptoms and did not show any correlations to the subjective fear of falling. The weighting of sensory inputs of PPV patients seems to be shifted toward the visual system.

The sensory shift towards the visual system also explains the common observation that PPV patients experience exacerbations of their complaints in situations requiring complex visual information processing (moving visual scenes, open spaces).

Our goal is to realize a programme of rehabilitation PPV with physical therapy and occupational therapy can help people learn movement strategies.

Therapists sometimes suggest simple devices to assist with daily activities.

Even people with serious vertigo after rehabilitation programme must maintain their independence and self-respect.

Conclusions

PPV patients show characteristic gait alterations: a reduced gait speed and vertigo on obstacle walking in special at women and presence of anxiety was more frequent at women. This changes correlate with the patients' subjective fear of falling.

Moreover, dual-task and eyes closed walking paradigms suggest that walking in PPV patients is characterized by an increased attentional control and a higher reliance on visual input, similar with obstacle walking. Rehabilitation process with physical and emotional therapy is the future of this patients.

Aknowledgements

We thanks to all our participants and subjects in this study.

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