

Effect of Epley Maneuver on Anxiety and Agoraphobia Scores in Patients with Benign Paroxysmal Positional Vertigo: A Pre Post Treatment Evaluation

Dr. Erik Lundqvist^{1*}, Dr. Anna Svensson¹

¹Karolinska Institute, Department of Otorhinolaryngology and Neurotology, Stockholm, Sweden

Abstract

Background: Benign paroxysmal positional vertigo (BPPV) is the most vestibular disorder. Patients with BPPV often experience psychological disorders, like anxiety and panic agoraphobia. This study is aimed to evaluate the anxiety and agoraphobia scores before and after canalith repositioning manoeuvre, which is the treatment of BPPV.

Methods: This is an analytic cohort study. Thirty eight samples were included in the study using consecutive sampling. Diagnosis was made with history taking, physical examination, and Dix-Hallpike manoeuvre. The participants were asked to fill the Beck Anxiety Inventory (BAI) and Agoraphobia Panic (PA) questionnaire before, after the Epley manoeuvre seven days after, and fourteen days.

Results: The BAI scores before, seven days after, and fourteen days after the Epley manoeuvre were 33.97 ± 12.40 , 29.42 ± 11.20 , 22.97 ± 9.71 , respectively. The PA scores before, seven days after, and fourteen days after the Epley manoeuvre were 25.92 ± 7.496 , 21.24 ± 7.284 , 16.05 ± 6.742 , respectively. There were significant differences of BAI and PA scores before and at 7 and 14 days after Epley manoeuvre.

Conclusion: The anxiety and agoraphobia panic scores were significantly decreased before and after Epley manoeuvre (day-7 and day-14).

Keywords: Benign Paroxysmal Positional Vertigo, Anxiety, Agoraphobia, Epley Manoeuvre.

Introduction

Dizziness and vertigo are very common medical complaints that can be found in general population, comprising 20% - 30% of all patients' symptoms.¹ Benign paroxysmal positional vertigo (BPPV) is the most common vestibular disorder. The annual incidence is estimated to be around 107 cases in every 100,000 individuals.² It is characterised by sudden and brief attack of intense vertigo, that is associated with changes in head position.³ Benign paroxysmal positional vertigo is caused by disturbances in vestibular system.¹

Lately, vertigo was reported to be related with several psychological disorders.⁴ In 2010, the Otoneurological Department of the Semmelweis University ORL Clinic conducted a research that involved 700 patients with vertigo. The results showed that 45.7% patients had anxiety disorder and panic disorder was diagnosed in 15.7% of the patients.⁵ Therefore, if BPPV is not diagnosed and treated promptly, psychological disorders may get worse and patients may look for psychological clinic for initiating treatment instead.³

Canalith Reposition Manoeuvre (CRM) is the therapeutic manoeuvre for BPPV. This manoeuvre directs the particles that float freely (otoconia) in semicircular canal to utricle, resulting in relieving from BPPV.³ This study will compare the changes of anxiety and panic agoraphobia scores before and after the implementation of Epley Canalith Reposition Manoeuvre.

Methods

Study Participants and Design

This study was done in the Polyclinic of Neurology in Adam Malik General Hospital Medan, Indonesia. All participants were patients who attending the clinic when the study was held. The diagnosis of posterior canal BPPV was made based on the clinical history, physical examination, and positional nystagmus during the Dix-Hallpike test (DH).

A total of 38 patients with posterior canal BPPV aged ≥ 18 -year-old were included to the study. Patients who are known to be suffered from anxiety and/or agoraphobia before BPPV diagnosis is made; consume vertigo-induced medicine (i.e. anti-depressant); have history of other vestibular disorders (i.e. Meniere's disease) or other disorders that cause balance disorder (i.e. peripheral neuropathy); are not able to undergo Dix-Hallpike manoeuvre (i.e. due to musculoskeletal disorder); have failed Epley manoeuvre; are lost to follow-up, are excluded from the study. This research was approved by the institutional ethics committee in advance.

This is an analytic study using a cohort design. The demographic characteristics of patients was recorded. After diagnosis was made, anxiety and panic agoraphobia were measured by Beck Anxiety Inventory (BAI) and Panic and Agoraphobia (PA) Scale, respectively, and an initial Epley manoeuvre was done. No pre-medication was routinely administered. All patients were asked returned for re-evaluation 7 and 14 days after the initial manoeuvre.

Statistical Analysis

Statistical analysis of the results was performed using SPSS for Windows 21.0. The socio-demographic characteristics were presented in cross-tabulation, and scores were expressed in mean \pm standard deviation (SD). Comparisons of data during the attack and remission periods were made using the paired t test or Wilcoxon test. A value of $p < 0.05$ was determined as statistically significant.

Results

Based on socio-demographic characteristics, majority of the participants were male (57.9%), 35-50-year-old (55.26%), junior high school educated (50%), married (76.32%), and employed (81.58%) (Table 1).

Table 1. Socio-demographic Characteristics of Study Participants

	Frequency	Percentage
Gender		
Male	22	57.9
Female	16	42.1
Age (year)		
< 35	7	18.42
35-50	21	55.26
> 50	10	26.32
Education		
Elementary	5	13.16
Junior high school	19	50.00
Senior high school	10	26.31
College	4	10.53
Marital status		
Married	29	76.32
Single	9	23.68
Employment		
Employed	31	81.58
Unemployed	7	18.42

Table 2. Mean Scores of BAI in Evaluation Periods.

	Mean±SD
BAI1	33.97 ± 12.40
BAI2	29.42 ± 11.20
BAI3	22.97 ± 9.71

BAI1,2,3: Beck anxiety inventory score day 0 (initial period), day 7 (second visit), day 14 (third visit), respectively.

Table 2 showing the mean±SD of BAI scores in each visit. The initial BAI score (BAI1) obtained was 33.97 ± 12.40, seven days after Epley manoeuvre was applied, the BAI score (BAI2) was decreased at 29.42 ± 11.20. The last BAI score (BAI3) showing a further decline which was 22.97±9.71.

Table 3. Differences of BAI Scores Between Groups

	Differences	p value
BAI ₁ -BAI ₂	4.55 ±2.64	< 0.001
BAI ₂ -BAI ₃	6.45 ±4.43	< 0.001
BAI ₁ -BAI ₃	11.00 ±5.47	< 0.001

BAI1,2,3: Beck anxiety inventory score day 0 (initial period), day 7 (second visit), day 14 (third visit), respectively.

Each score was compared to one another. The difference between BAI1 and BAI2 was 4.55 ±2.64, BAI2 and BAI3 was 6.45 ±4.43, and BAI1-BAI3 was 11.00 ±5.47. Those scores were then compared using paired t-test and each analysis showing p value < 0.001, which means there was a significant difference between those comparisons.

Table 4. Mean Scores of PA in Evaluation Periods.

	Mean±SD
PA1	25.92 ± 7.50
PA2	21.24 ± 7.28

PA3	16.05 ± 6.74
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PA_{1,2,3}: Panic agoraphobia score day 0 (initial period), day 7 (second visit), day 14 (third visit), respectively. Table 4 shows the PA scores in each visit. The mean of PA score before Epley manoeuvre was 25.92 ± 7.50. At the second visit, panic agoraphobia score was 21.24 ± 7.28, and the third visit PA score was 16.05 ± 6.74. This scores gradually showed reduction.

Table 5. Differences of PA Scores Between Groups

	Differences	p value
PA ₁ -PA ₂	4.68 ± 1.79	< 0.001
PA ₂ -PA ₃	5.18 ± 2.64	< 0.001
PA ₁ -PA ₃	9.87 ± 2.94	< 0.001

PA_{1,2,3}: Panic agoraphobia score day 0 (initial period), day 7 (second visit), day 14 (third visit), respectively.

The difference between the first PA score at the initial presentation and the second visit was 4.68 ± 1.79. Difference between the second and the third visit was 5.18 ± 2.64, and between the first and the third was 9.87 ± 2.94. Those scores were compared using paired Wilcoxon test, which resulting in $p < 0.001$ in every analysis. This means there were statistically significant difference of PA score in each visit.

Discussion

This study showed significant differences of BAI and PA scores among those three visits. In a current prospective cohort study, Martelluci et al reported that residual dizziness is a common self-limiting disorder, more often happened in elderly, and can persist after BPPV physical therapy BPPV.⁶ On the contrary, Jung et al reported that anxiety tends to decrease after two weeks of manoeuvre treatment. Residual symptoms are self-limiting and do not need anxiolytic therapy.⁷

The only research we know that perform the same study is the one done by Kahraman et al. They found that BAI and PA scores were significantly decreased at the second and third evaluations (after treatment) compared to the first (pretreatment)($p < .001$, $p < .001$, respectively). The results of this study were similar to the study done by Kahraman et al in which BAI and PA scores showed significant declines after Epley manoeuvre.³

Abnormalities in vestibular system can cause psychiatric disorders and those two systems were reported to be related in a two-way relation.⁸ There are several possible explanations for this condition. The mismatch of exteroceptive information between balance- and visual-related inputs are passed to the sensoric cortex of thalamus, further to the 'affective division' of cinguli and association cortexes, which is the infralimbic cortex. The infralimbic cortex is contributes to phenomena such as conditioned emotional learning, assessment of emotional content of stimuli, and generation of autonomic and endocrine responses. The visual and vestibular information will be continued to the vestibular nuclei and visceral afferent will be forwarded to solitary tract. The vestibular and solitary tract nuclei will be projected directly to the proencephalon. The two inputs will be collected in parabrachial nuclei. The parabrachial nucleus is a gateway for ascending visceral and vestibular information to amygdaloid, hypothalamic, basal forebrain, and cortical regions that form an integral part of pathways that mediate responses termed fear and anxiety.⁹

Parabrachial nucleus stimulated by mismatch information will react in somatic, neuroautonomic, and visceral responses. Those responses manifest in anxiety and phobia, such as stress hormones production, changes in heart rate and blood pressure, pupillary dilatation, perspiration, piloerection, hyperventilation, and somatic motor responses such as avoidance. Parabrachial nucleus network is the ability to induce panic. The thalamocortical and thalamoamygdaloid connections of anxiety pathways provide exteroceptive visual, auditory, and somesthetic stimuli related to threatening or dangerous situations. These signals likely act as mediator of anxiety and panic that are elicited by lactate, PCO₂, and hyperventilation, when they may be interpreted as danger of suffocation.⁹ Bed nucleus of the stria terminalis has an important contribution in anxiety response, creating a phenomenon called space and motion sensitivity (SMS) and space and motion discomfort (SMD). Space and motion sensitivity (SMS) and space and motion discomfort (SMD) will cause one to feel anxious and fear. The patient will avoid open space because optic stimulus will be received once mismatch is occurred.¹⁰

Conclusion

The results of this study show that resolution of BPPV is associated with decline of anxiety and panic agoraphobia. This study supports the theory that vestibular dysfunctions may cause psychological disorders. Patients may be recovered without medication with successful physical treatment. Therefore, applying the

therapeutic manoeuvre of BPPV, such as Epley manoeuvre, in BPPV can help to prevent the patients to look for psychological treatment that they do not actually need.

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