SEKOLAH TINGGI ILMU KESEHATAN TELOGOREJO

Physiotherapy and Physical Rehabilitation Journal
Volume 2 Issue 1 Year 2023 Pages 1-6
E–ISSN 2830-7151
Web https://ojs.stikestelogorejo.ac.id/

Administration of Epley maneuver and stretching exercise in Benign Paroxysmal Positional Vertigo: a Case Report

Dwiky Yudhistira [(1)], Umi Budi Rahayu [(1)], Ismadi [(2)]

1) Departement of Physiotherapy, Universitas Muhammadiyah Surakarta, Indonesia
2) Physiotherapist, RSUD Wonosari Gunungkidul, Indonesia

*Correspondence to: *J130225032@student.ums.ac.id*

Abstract: Benign paroxysmal positional vertigo (BPPV) is a disease that is often encountered by everyone, including the elderly, characterized by dizziness and a sudden spinning sensation when doing positioning movements that can interfere with daily activities. Treatment of BPPV can be given the intervention of the Epley maneuver which is considered capable of reducing the sensation of spinning in BPPV but there has been no research in overcoming the secondary problem of BPPV, namely stiffness in the neck muscles. Giving stretching exercises to the neck area is considered capable of reducing pain, as well as improving neck function and quality of life. Purpose: to determine the effectiveness in reducing the sensation of spinning, neck muscle stiffness, and increasing functional ability in BPPV. Methods: a study using the case report method in a 50-year-old male patient diagnosed with left BPPV 6 months ago. The patient complains of a headache accompanied by a feeling of spinning and lightheadedness as well as muscle stiffness in the neck. Examination of the dix Hallpike maneuver in the patient was positive. Patients were given physiotherapy interventions in the form of Epley maneuvers and stretching exercises. Results: decreased dizziness and spinning sensation at the fifth meeting and stiffness of the neck muscles which were evaluated using the Numeric Rating Scale (NRS) and a 50% reduction at the third meeting which was evaluated using the Dizziness Handicap Inventory (DHI). Conclusion: there is effectiveness in reducing the sensation of spinning, neck muscle stiffness, and increasing functional ability in BPPV.

Keywords: benign paroxysmal positional vertigo; muscle stiffness; epley maneuver; stretching exercise

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is a disease that is often found by everyone, including the elderly. According to You et al. (2019), BPPV is the most common peripheral vestibular disease and is characterized by dizziness, a sudden and transient spinning sensation accompanied by a characteristic nystagmus. A person indicated by BPPV will experience complaints of a spinning sensation when changing positions from supine to side, side to sitting, or vice versa so that it can interfere with daily activities. The prevalence of BPPV worldwide is 2.4% (Kim et al., 2021). Meanwhile, according to Uz et al. (2019), the elderly have a prevalence of 36-45% of all ages where BPPV is indicated. The main causal factors for BPPV are still unknown, although these cases may be associated with head trauma, lying down for too long, or various disorders involving the inner ear (Kim et al., 2021). According to You et al. (2019), women with an age range of 50-65 years have a greater risk of developing BPPV than men with the same age range.

In the treatment of BPPV, various intervention maneuvers can be given, one of which is the Epley maneuver. The Epley maneuver is a form of exercise to return released otolytic debris back into the utricle so as to reduce dizziness and spinning sensations in vertigo (Ribeiro et al., 2017). According to Uz et al. (2019), giving the Epley maneuver has a positive effect on the quality of life in patients with a history of BPPV. Giving the Epley maneuver is considered to be able to reduce the spinning sensation in BPPV, but there has been no research that addresses the secondary problem of BPPV, namely stiffness in the muscles around the neck. Neck muscle stiffness in BPPV can arise due to the inability to move the neck due to dizziness and a spinning sensation. According to Tunwattanapong et al. (2016), giving stretching -

Doi : xxxx-xxxxx-xxxxxx

exercises to the neck area can reduce pain, as well as improve neck function and quality of life. In the condition of BPPV accompanied by neck muscle stiffness with interventions in the form of Epley maneuvers and stretching exercises, it is an important point to determine the effectiveness in reducing the sensation of spinning, neck muscle stiffness, and increasing functional abilities so that researchers are interested in discussing these problems.

MATERIALS AND METHODS

Case Description

A 50-year-old male farmer came to the physiotherapy clinic for medical rehabilitation at the Wonosari Gunungkidul Hospital with complaints of head pain accompanied by spinning and fireflies for the past 1 year and muscle stiffness in the neck. Complaints in patients will worsen when tilted to the left and when tilted to sit, especially spontaneous movements. The patient had fallen from a tree 2 meters high 4 years ago with his head hitting the ground on his back. At the time after the fall, the patient was rushed to the hospital but from the results of the doctor's examination there were no signs of head or body injuries. In mid-2022, the patient felt a severe headache that interfered with his activities and was treated at the Wonosari Gunungkidul general hospital. From the results of the neurologist's examination, the patient was diagnosed with left BPPV and the neurologist gave a referral for therapy at the physiotherapy medical rehabilitation polyclinic at Wonosari Hospital, Gunungkidul. The patient is unable to sleep on his left side.

Examination

On observation of patients coming to the physiotherapy room, it was seen that the patient was enduring pain accompanied by a slightly lateral dextra flexion of the head and was less stable when walking. From the results of palpation examination there is an increase in tone on m. Sternocleidomastoideus and m. upper trapezius dextra. Examination of pain there is tenderness in m. Upper trapezius and m. Sternocleidomastoideus dextra was 6, and motion pain was 4 and spinning sensation was 7. The specific test of the dix hallpike maneuver was positive because of nystagmus in the left eyeball. When the Dizziness Handicap Inventory (DHI) was measured before the intervention, a total result of 42 out of 100 was obtained (moderate limitation).

Method

Assessment and examination were carried out prior to intervention to diagnose physiotherapy and prognosis. According to the doctor's referral, therapy was given 6 times, 2 times a week. Evaluation was given before and after the intervention was carried out by using a Numeric Rating Scale to measure pain and Dizziness Handicap Inventory (DHI) for functional ability.

Intervention

According to Choi et al. (2020), giving the Epley maneuver for BPPV can be done from the head rotated 45^{o} to the side of the patient while sitting upright. Then, the patient is transferred from a sitting to a supine position with the head suspended for 1 minute or until the pulsating nystagmus subsides. The head is turned 90^{o} to the unaffected side while sleeping on the side so that the head is in a nearly downward position. The patient is then brought to a sitting position.

Stretching exercise on the neck is divided into 3 parts, the first part starts from sitting upright and placing your hands above your head. Then bend your neck to the side accompanied by lowering your shoulders so that there is a stretch. Then repeat on the other side. The second part begins by placing the hands on the temporal muscles and bending the movements to the sides to stretch the muscles. The third part starts from placing the hand on the temporal bone, tilting the head and rotating it upwards. Then leave your head in that position. In stretching exercises performed on both sides, both left and right (Minguez-Zuazo et al., 2016).

Doi : xxxx-xxxxx-xxxxxx

RESULT

The results of the intervention for 2 weeks in 5 sessions with the intervention of the Epley maneuver and stretching exercise showed a decrease in the sensation of spinning by 5 at the fourth meeting, tenderness m. Sternocleidomastoideus and m. upper trapezius dextra until the third meeting and motion pain in the neck until the second meeting.

Table 1. Numeric Rating Scale Evaluation

NRS	P0	P1	P2	P3	P4	P5
Tenderness	6/10	3/10	2/10	0/10	0/10	0/10
Motion pain	4/10	2/10	0/10	0/10	0/10	0/10
Dizziness	7/10	6/10	5/10	4/10	2/10	0/10

The results of the Dizziness Handicap Inventory measurement show that there is a decrease in the value of the physical score, emotional score, and functional score which are evaluated once a week. At the third meeting, DHI measurements were carried out with a total result of 25 out of 100 (mild limitations) so that there was a decrease of 40%.

Table 2. Dizziness Handicap Inventory Evaluation

DHI	P0	P3	P5
Physical score	18/28	10/28	0/28
Emotional score	12/36	6/36	0/36
Functional score	12/36	9/36	0/36
Total score	42/100	25/100	0/100

DISCUSSION

Benign paroxysmal positional vertigo (BPPV) is a neurological disorder that can interfere with daily activities. Disorders that can be felt are in the form of spinning sensations and fireflies so that changing positions from supine to tilted, tilted to sitting, or vice versa is disturbed. Providing exercises in the form of Epley maneuvers and stretching the neck is a form of intervention that is applied to patients with a history of BPPV.

The results of the intervention for 3 weeks in 5 meetings with the intervention of Epley maneuver and stretching exercise can be revealed by the patient's decrease in the feeling of spinning after being given exercises both in the physiotherapy room and the home program at each meeting which is also proven from the results of measuring the sensation of spinning within 1 week on patients decreased by 43%, which is in line with the opinion of Uz et al. (2019) and Ribeiro et al. (2017) that the administration of the Epley maneuver in patients with a diagnosis of BPPV can have a positive effect on the patient's quality of life.

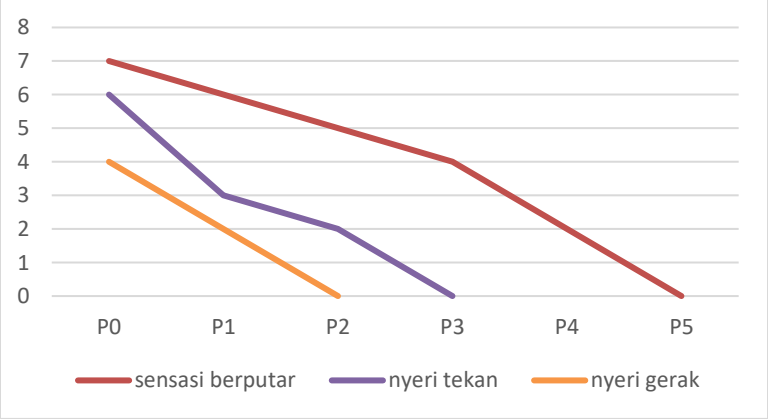

Figure 1. Numeric Rating Scale

Doi : xxxx-xxxxx-xxxxxx

According to Bulğurcu et al. (2022), administration of the Epley maneuver has a positive effect by increasing migration of the otoliths attached to the canal so as to reduce dizziness and spinning sensations and increase limited functional abilities as expressed by the patient who after receiving therapy for one week was able to sleep on his left side although occasionally still feel the feeling of spinning.

The patient felt more comfortable and less stiff in the neck area after being given a stretching exercise with a decrease in the value of tenderness and motion pain at the second and third meetings, so that it was in line with the opinion of Minguez-Zuazo et al. (2016) that therapeutic exercises by being given stretching exercises seem to be beneficial in reducing neck stiffness and dizziness.

At the fifth meeting, the patient was able to carry out normal activities such as work and worship without feeling dizzy and spinning sensation which he proved had a decrease in the DHI value so that it was in line with the opinion of Regauer et al. (2020) that giving the Epley maneuver and stretching exercise to the neck can improve functional abilities. The patient refused to continue the sixth therapy because the patient felt better for the complaints he felt.

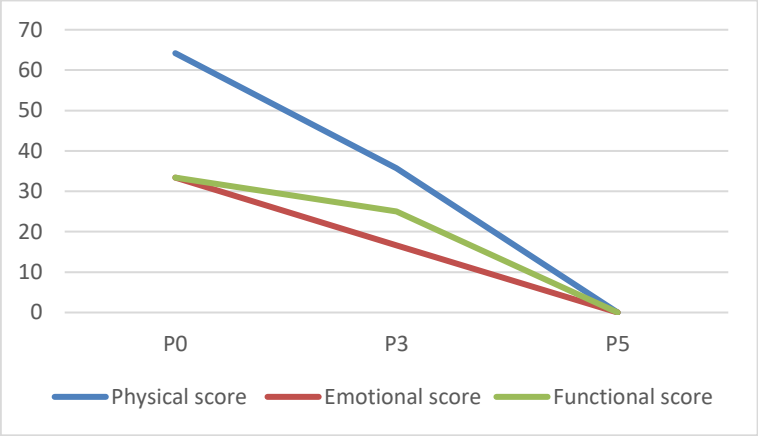

Figure 2. Dizziness Handicap Inventory

BPPV is a vestibular disorder that can occur in all ages, including the elderly. According to Power et al. (2020) and Swain (2023), BPPV is a mechanical disorder of the peripheral vestibular system, characterized by brief recurrent episodes (less than 1 minute) of positional vertigo caused by detached calcium carbonate crystals (otoliths). from the utricle and running into a semicircular canal (canalithiasis), or less commonly, attached to the cupula and making it sensitive to gravity (cupulolithiasis). According to Sfakianaki et al. (2021) and Yetiser (2019), in most cases, the causes of BPPV are idiopathic, but can also be secondary (after head trauma, viral infection, Meniere's disease, migraine, otologic and non-otologic operations, bed rest long).

The mechanism of BPPV according to the theory of cupulolithiasis can result from deflection of the cupula of the posterior canal by movement of the otolith in the posterior canal (Gaur et al., 2015). The journey of the otolith to BPPV can start from the release of the otolith which leaves the utricle and floats freely in the semicircular canal or attaches to the cupula, making the labyrinth sensitive to gravitational forces so that when the head remains static there is no stimulation but with movement, the displacement of the otolith shifts inside fluids create stimuli and incoherent signals that will result in vertigo sensations (Palmeri & Kumar, 2023; Sfakianaki et al., 2021).

Giving the Epley maneuver is expected to reduce the sensation of vertigo by balancing the otolith pressure or removing the otolith from the cupula which will create the same signal on both sides of the ear. According to Bhattacharyya et al. (2017), giving the Epley maneuver is more effective when compared to other maneuvers and complete resolution of vertigo occurs significantly more frequently in the Epley maneuver treatment group when compared to other maneuvers or controls. The limitation in this study is that there is no specification of BPPV and supporting examinations from other professional health workers.

Doi : xxxx-xxxxx-xxxxxx

In the process of measuring pain, it was not quite right, who only asked 3 days ago because it was feared that respondents could not recall pain memory so that the results of pain measurements became subjective.

CONCLUSION

The provision of Epley maneuver intervention and stretching exercise for 5 meetings on Benign paroxysmal positional vertigo (BPPV) can be concluded to be able to reduce the sensation of spinning, stiffness in the neck, and increase functional ability.

AUTHOR CONTRIBUTION

Dwiky Yudhistira is researcher main choose topic, write papers, and collect data.Umi Budi Rahayu as supervisor and review of study documents. ismadi as supervisor of research area

CONFLICT OF INTEREST

Writer state no there is conflict interest in writing this.

ACKNOWLEDGEMENT

The author would like to thank all those who have helped us in writing this. Also, we would be grateful to database providers such as Google Scholar and PubMed.

REFERENCES

Bhattacharyya, N., Gubbels, S. P., Schwartz, S. R., Edlow, J. A., El-Kashlan, H., Fife, T., Holmberg, J. M., Mahoney, K., Hollingsworth, D. B., Roberts, R., Seidman, M. D., Steiner, R. W. P., Do, B. T., Voelker, C. C. J., Waguespack, R. W., & Corrigan, M. D. (2017). Clinical Practice Guideline: Benign Paroxysmal Positional Vertigo (Update). In *Otolaryngology - Head and Neck Surgery (United States)* (Vol. 156, Issue 3_suppl, pp. S1–S47). SAGE Publications Inc. https://doi.org/10.1177/0194599816689667

Bulğurcu, S., Baz, E., Güleryüz, S., Erkul, E., & Çekin, E. (2022). Effect of applying head-shaking maneuver before Epley maneuver in BPPV. *Brazilian Journal of Otorhinolaryngology*, *88*(6), 932–936. https://doi.org/10.1016/j.bjorl.2020.12.015

Choi, S. Y., Cho, J. W., Choi, J. H., Oh, E. H., & Choi, K. D. (2020). Effect of the Epley Maneuver and Brandt-Daroff Exercise on Benign Paroxysmal Positional Vertigo Involving the Posterior Semicircular Canal Cupulolithiasis: A Randomized Clinical Trial. *Frontiers in Neurology*, *11*(December), 1–7. https://doi.org/10.3389/fneur.2020.603541

Gaur, S., Awasthi, S. K., Bhadouriya, S. K. S., Saxena, R., Pathak, V. K., & Bisht, M. (2015). Efficacy of Epley's Maneuver in Treating BPPV Patients: A Prospective Observational Study. *International Journal of Otolaryngology*, *2015*, 1–5. https://doi.org/10.1155/2015/487160

Kim, H. J., Park, J. H., & Kim, J. S. (2021). Update on benign paroxysmal positional vertigo. *Journal of Neurology*, *268*(5), 1995–2000. https://doi.org/10.1007/s00415-020-10314-7

Minguez-Zuazo, A., Grande-Alonso, M., Saiz, B. M., Touche, R. La, & Lara, S. L. (2016). Therapeutic patient education and exercise therapy in patients with cervicogenic dizziness: a prospective case series clinical study. *Journal of Exercise Rehabilitation*, *12*(3), 216–225. https://doi.org/10.12965/jer.1632564.282

Palmeri, R., & Kumar, A. (2023). *Benign Paroxysmal Positional Vertigo*. StatPearls Publishing.

Power, L., Murray, K., & Szmulewicz, D. J. (2020). Characteristics of assessment and treatment in Benign Paroxysmal Positional Vertigo (BPPV). *Journal of Vestibular Research: Equilibrium and Orientation*, *30*(1), 55–62. https://doi.org/10.3233/VES-190687

Regauer, V., Seckler, E., Müller, M., & Bauer, P. (2020). Physical therapy interventions for older people with vertigo, dizziness and balance disorders addressing mobility and participation: a systematic review. *BMC Geriatrics*, *20*(1), 1–12. https://doi.org/10.1186/s12877-020-01899-9

Ribeiro, K. M. O. B. de F., Freitas, R. V. de M., Ferreira, L. M. de B. M., Deshpande, N., & Guerra, R. O.

(2017). Effects of balance Vestibular Rehabilitation Therapy in elderly with Benign Paroxysmal Positional Vertigo: a randomized controlled trial. *Disability and Rehabilitation*, *39*(12), 1198–1206. https://doi.org/10.1080/09638288.2016.1190870

Sfakianaki, I., Binos, P., Karkos, P., Dimas, G. G., & Psillas, G. (2021). Risk factors for recurrence of benign paroxysmal positional vertigo. A clinical review. *Journal of Clinical Medicine*, *10*(19). https://doi.org/10.3390/jcm10194372

Swain, S. K. (2023). *Revisiting pathophysiology of benign paroxysmal positional vertigo : a review*. *9*(4), 355–360.

Tunwattanapong, P., Kongkasuwan, R., & Kuptniratsaikul, V. (2016). The effectiveness of a neck and shoulder stretching exercise program among office workers with neck pain: A randomized controlled trial. *Clinical Rehabilitation*, *30*(1), 64–72. https://doi.org/10.1177/0269215515575747

Uz, U., Uz, D., Akdal, G., & Çelik, O. (2019). Efficacy of epley maneuver on quality of life of elderly patients with subjective BPPV. *Journal of International Advanced Otology*, *15*(3), 420–424. https://doi.org/10.5152/iao.2019.6483

Yetiser, S. (2019). Review of the pathology underlying benign paroxysmal positional vertigo. *Journal of International Medical Research*, *48*(4). https://doi.org/10.1177/0300060519892370

You, P., Instrum, R., & Parnes, L. (2019). Benign paroxysmal positional vertigo. In *Laryngoscope Investigative Otolaryngology* (Vol. 4, Issue 1, pp. 116–123). John Wiley and Sons Inc. https://doi.org/10.1002/lio2.230