

Original Research Article

Effect of barbecue role and Gufoni maneuvers on quality of life in patients with horizontal semicircular canal benign paroxysmal positional vertigo

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ABSTRACT

Background: Benign paroxysmal positional vertigo (BPPV) is the most common cause in patients with vertigo. Horizontal semi-circular canal BPPV (HSCBPPV) is up to 20% of BPPV. Quality of life (QoL) is significantly impaired by vertigo. Aim of present research was to study the effect and compare barbecue role and Gufoni maneuvers on QoL in patients with HSCBPPV.

Methods: 60 individuals with unilateral HSCBPPV were selected. 2 groups barbecue role and Gufoni were formed and 30 individuals were selected in each group randomly. Vestibular activities and participation (VAP) and positional test were administered before and after barbecue role and Gufoni maneuvers to fulfill the aim.

Results: VAP scale results revealed significant difference between pre and post treatment score in both groups, suggestive of positive effect on quality of life in patients with HSCBPPV. Improvements in VAP score between both groups were compared and significant difference was observed. Positional test post treatment revealed that 83.33% and 70% patients improved in barbecue role and Gufoni respectively.

Conclusions: Barbecue role found to be better than Gufoni in treatment of unilateral HSCBPPV.

Keywords: HSCBPPV, PPN, VAP, ICF, Barbecue role maneuver, Gufoni maneuver

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is a mechanical labyrinthine disorder characterized by positional vertigo and paroxysmal positional nystagmus (PPN), both caused by changes of the position of the head with respect to gravity.

BPPV may be divided in to three types based on canal involvement posterior, horizontal, and anterior semicircular canal BPPV.¹ The first reports of BPPV due to involvement of the lateral canal (LC) were published in 1985, and the first suggestions on how to treat this variant were in 1994. Lateral canal BPPV accounts for

17% of all BPPV patients, with no difference in gender or which side is involved. In about 10% of such patients it is not possible to identify the pathological side. About 80% of lateral canal patients present with the geotropic form (beating toward the ground), 20% with the apogeotropic (beating away from the ground). In about 4% of all patients, PPN is atypical.²

Pathophysiology may be explained with two currents cupulolithiasis and canalolithiasis. In cupulolithiasis, degenerated otoconia in the utricle adhere to the cupula of the semicircular canal, making it denser than the surrounding endolymph, and thus more susceptible to the effects of gravity. The canalolithiasis theory contends that

degenerated otoconia do not adhere to the cupula but remain floating in the endolymph of the posterior canal. In both theories, head movements cause the fragments to move, which stimulates the cupula of semicircular canal inappropriately and excites the ampullary nerve, resulting in vertigo.³

In lateral canal BPPV the vertigo is mainly triggered by rolling onto a side while lying down. The vertigo and autonomic symptoms in patients with lateral canal involvement can be intense, and these patients are forced to lie immobile in a supine position. A feeling of floating, a sensation as if walking on pillows and postural instability are sometimes associated with BPPV.⁴ The etiology of BPPV may involve cranial trauma, metabolic diseases, hormone dysfunction, and other conditions; in most cases, however, BPPV is idiopathic.

The diagnosis and treatment of BPPV can significantly improve the quality of life (QoL) in patients with BPPV. Positional test is gold standard in diagnosing HSCBPPV. QoL can be assessed by various scales.⁵

The development of simple treatment procedures for the most common cause of vertigo is probably the most important (therapeutic) breakthrough in the field of neurotology in the past 25 years. Barbecue role and Gufoni maneuvers are used for treatment of horizontal canal BPPV.⁵ Aim of the present research was to study the effect and compare barbecue role and Gufoni maneuvers on quality of life in patients with HSCBPPV.

METHODS

Present study was carried out between August 2014 to December 2017 after approval from ethical committee at Geetanjali Medical College and Hospital, Udaipur. It was a longitudinal study, where total 60 individuals were included in this study with unilateral horizontal canal BPPV based on positive positional test. 2 groups barbecue role and Gufoni were formed and 30 individuals were selected randomly in each group. Positional test and vestibular activities and participation (VAP) scale based on international classification of functioning (ICF), disability and health were administered pre and post treatment to evaluate efficacy and results of both groups were compared to find which treatment provides better quality of life in patients with HSCBPPV.

Positional test was administered using standard protocol, M-glasses were used to reveal the nystagmus and avoid visual fixation. Testing of the lateral canals begins with the patient supine with the head flexed forward about 30 degrees to align the lateral canals with earth vertical. The head is then quickly rotated 90 degrees to one side, often called the supine roll test. A patient with LC-BPPV will have nystagmus and vertigo with either ear down. One of two types of nystagmus may be observed: Geotropic nystagmus in which the eyes beat toward the lower ear, and apo-geotropic in which the eyes beat toward the

uppermost ear. The geotropic variant is about four times more common. Geotropic HC-BPPV is attributed to free-floating otoconia (canalolithiasis), and the nystagmus is more intense with the affected ear down (due to Ewald's second law that the excitatory response elicited by ampullopetal flow is stronger than the inhibitory response elicited by ampullofugal flow). The nystagmus often lasts longer than in posterior canal canalolithiasis but usually fatigues within 20-30s. Apo-geotropic HC-BPPV is usually attributed to cupulolithiasis, though it may also occur when free floating otoconia are relatively close to the cupula. The nystagmus is more intense when lying with the affected ear up (heavy cupula up). Thus, first determine whether the nystagmus beats toward or away from the ground, and then determine on which side it is more intense. If apo-geotropic, the affected ear is up when the nystagmus is most intense, and if geotropic the affected ear is down when the nystagmus is most intense.⁶

After confirmation of HSCBPPV, VAP scale was administered. VAP includes domains like attention, daily routine, psychological demands, travelling, job, recreation, and socialization. VAP was developed by Alghwiri in 2012 in English. VAP was adopted in Indian context and translated in Hindi with prior permission from author and reverse translation was done as WHO and authors recommendation. Questions were asked by the clinician and the rating was done on each task. Total score was obtained by calculating the average score without considering NA (not applicable) (none=0, mild=1, moderate=2, severe=3, unable to do=4, maximum score=4, minimum score=0).^{7,8}

On completion of pre-treatment evaluation barbecue role and Gufoni maneuvers were administered using standard protocol. The barbecue rotation is the first and probably most popular treatment option for horizontal canal BPPV. The maneuver begins from supine (nose up) position. The head is rotated quickly 90 degrees in the direction of the healthy ear so that the affected ear is up. After about 30-60 s, when the provoked nystagmus has subsided, a second fast 90 degrees head rotation is performed in the same direction. To facilitate this, the patient's shoulders and body are first rotated to a prone position so that the head can be turned quickly to nose down position. After another 30-60 s, the head is again turned in the same direction, so that the affected ear is down. Finally, after another 30-60 s, the patient is brought to sitting position. These fast rotations of the head should send the otoconial debris away from the ampulla and out of the canal. Some authors do a further fast rotation of the head to bring the patient back to nose-up position. In other words, the barbecue rotation can be through 270 or 360 degrees. Unlike the Semont maneuver, the barbecue rotation does not provoke a laboratory nystagmus of prognostic value. However, if geotropic nystagmus occurs when the affected ear is rotated to the ear down (270 degrees) position the maneuver will probably not be successful.^{9,10}

Gufoni’s maneuver is a laboratory maneuver, similar to the Semont maneuver, which can clear the labyrinth immediately when successful. From the sitting position with the head facing forward, the patient is quickly brought down onto the healthy side, and then the head is rotated about 45 degrees down, so that the nose is on the bed. The head must decelerate rapidly as it makes contact with the bed. After 2 minutes in this position, the patient is returned to the upright position.¹¹ The maneuver should allow the particles to exit the canal due to the centrifugal force created by rapid deceleration and by gravity, when the head is maintained with the nose down for 2 min. The maneuver can be repeated two or three times sequentially. This treatment is easier to perform than the barbecue rotation and is a good option when the patient is moderately tolerant of vertigo.

Patients who refuse to give written consent and patients did not come for follow-up were excluded from study. Patients who were on medication were excluded from study and no medication was prescribed to the patients during this study. Positional test was administered immediately after maneuvers, if nystagmus persisted maneuver was repeated till the nystagmus disappeared or intensity was decreased, maximum thrice maneuver was repeated and results were documented. After 7 days again VAP scale was administered and results were documented. Results were tabulated and Statistical analysis was done using paired t-test and ANOVA.

RESULTS

Descriptive statistics

All patients gave written consent. 12 patients excluded from study as they did not come for follow up. Total 60 individuals with unilateral HSCBPPV were included in the present study, comprised of 21 (35%) male and 39 (65%) female patients. The age of the patients ranged from 31 to 70 years, with the mean age being 49.96±13.96 years and maximum number of patients being in the age group of 41 to 50 years.

VAP scale scores pre and post treatment

VAP scores pre- and post-treatment were compared using paired t-test for barbecue role and Gufoni maneuver. VAP mean scores before treatment (barbecue role maneuver) were 2.43 with SD 0.20. VAP mean scores after treatment were 0.82 with SD 0.83. Paired t-test shows highly significant difference between VAP scores pre and post barbecue role maneuver with p value 0.00003 (Table 1).

VAP mean scores before treatment (Gufoni maneuver) were 2.54 with SD 0.13. VAP mean scores after treatment were 1.24 with SD 1.03. Paired t-test shows highly significant difference between VAP scores pre and post Gufoni maneuver with p value 0.00014 (Table 1).

Table 1: Mean VAP scores, SD, and p value within both groups.

VAP scale scores	Mean	SD	P value	Result
Before barbecue maneuver	2.43	0.20	0.00003	HS
After barbecue maneuver	0.82	0.83		
Before Gufoni maneuver	2.54	0.13	0.00014	HS
After Gufoni maneuver	1.24	1.03		

HS=highly significant.

The effect of barbecue and Gufoni maneuvers, in both groups were analyzed. VAP scores pre- and post-treatment were compared using AONVA. No significant difference was found before treatment and significant difference was found after treatment (Table 2).

Table 2: Mean VAP scores and p value between both groups.

VAP scale scores	Mean	SD	P value	Result
Before barbecue maneuver	2.43	0.20	0.364	NS
Before Gufoni maneuver	2.54	0.13		
After barbecue maneuver	0.82	0.83	0.029	S
After Gufoni maneuver	1.24	1.03		

NS=not significant, S=significant.

Comparison of improvement on VAP results between both groups

Improvement was calculated by subtracting post-treatment VAP score from pre-treatment VAP scores in both groups i.e. barbecue and Gufoni group. Improvement was compared between groups with ANOVA, statistically significant difference was found between both groups (Table 3).

Table 3: Mean improvement of VAP scores and p value between both groups.

Group	Mean improvement of VAP scores	P value ANOVA
Barbecue role maneuver	1.61	0.029
Gufoni maneuver	1.30	

Positional test results

Positional test was administered pre and post barbecue role and Gufoni maneuvers. All patients had nystagmus before treatment. No nystagmus after treatment on positional test recorded as improvement. 25 out of 30 (83.33%) patients improved with Barbecue role maneuver, 21 out of 30 (70%) patients improved with Gufoni maneuver (Figure 1).

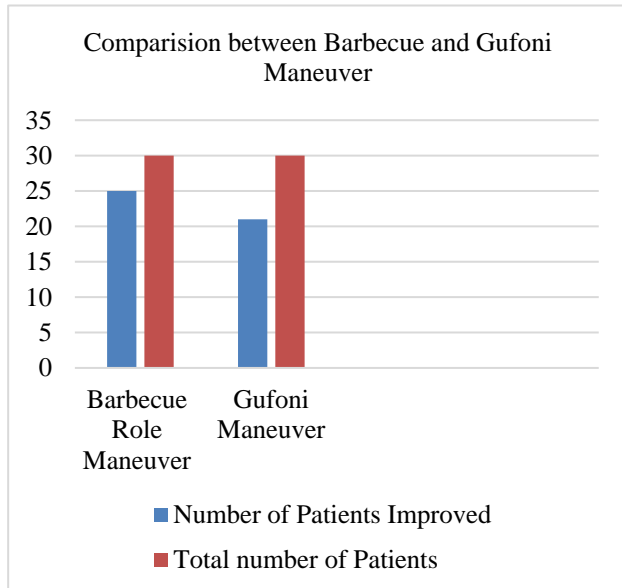


Figure 1: Positional test results pre and post maneuvers.

DISCUSSION

BPPV generally observed in older age group individuals, however it may be observed in early age with head trauma. Present study observed that mean age of patients with HSCBPPV was 49.96 years which is in correlation with previous studies.^{2,5} In present study gender distribution revealed that females were 65% however previous studies showed that female is to male ratio is higher which is 75 to 85%.¹

In this study significant difference was found between pre- and post-treatment mean VAP scores between barbecue role maneuver, and Gufoni maneuver group. This reveals that both methods had positive effect on quality of life in patients with horizontal canal BPPV. To find which method is better, improvement in VAP scores were compared and significant difference was found among both groups. More improvement mean score was observed in barbecue role maneuver group than Gufoni maneuver group. This finding was consistent with the study done by others assessing quality of life using other scales.¹⁵ There are no studies in best knowledge of authors done until now using VAP scale. Restrictions were given to all patients. Not to sleep on bad ear side, not to have jerky movement, avoid excessive head movements, and avoid exercises.

Nystagmus is induced with positional test. The nystagmus has geotropic form in cases of canalolithiasis, and apogeotropic in cases of cupulolithiasis. There is discrepancy in treatment method of cupulolithiasis that in barbecue role maneuver starting step will be toward affected ear and in Gufoni maneuver while turning head 45 degree down in third step, turn head 45 degree up. It was followed in this study also. Positional test is gold standard test for diagnosis and to evaluate efficacy of treatment in HSCBPPV. After treatment if no nystagmus is observed, it suggests that dislodged otconia are repositioned in utricle.¹² Results of positional test indicate physiological improvement in patients, and it was observed that 83.33% patients improved with barbecue role maneuver, and 70% patients improved with Gufoni maneuver. This finding was consistent with the study done by others.^{13,14}

Use of the VAP scale in the study sample revealed that vertigo negatively affected the QoL of patients in all dimensions of daily life. VAP includes domains like attention, daily routine, psychological demands, travelling, job, recreation, and socialization. The functional aspects investigate the effect of vertigo on specific eye, head and body movements, focusing in the subject's ability to carry out professional, household, social and leisure activities, and his or her independence in performing specific tasks such as walking independently and walking across the house in the dark. The emotional scores of the VAP scale investigate the possibility of dizziness having worsened the QoL of patients and giving rise to frustration, fear of leaving the house unaccompanied, fear of staying alone at home, concerns with the self-image, concentration disorders, feelings of incapacity, changes in family and social relationships, and depression. VAP evaluates participation and limitation of individuals with vertigo in daily activities more extensively than the earlier scale since it is based on ICF model.^{7,8}

Limitation of the study

VNG (videonystagmography) can be used to improve the objectivity.

CONCLUSION

Results of VAP score and positional test correlated with each other. According to results of both tests it was observed that barbecue role maneuver has produced more improvement than Gufoni maneuver. It suggests that improvement at physiological level and improvement in all dimensions of quality of life are directly proportional.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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