



Apogeotropic variant of nystagmus in a post vaginal hysterectomy patient- A case report

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ABSTRACT:

Introduction: Anterior limb canal lithiasis or cupulolithiasis of horizontal canal are the two main attributing causes of apogeotropic variant of horizontal canal BPPV. Most commonly posterior canal BPPV is noted in most patients especially post trauma or in a recumbent patient. Here we discuss a unique presentation of patient with right horizontal canal cupulolithiasis post a vaginal hysterectomy.

Case Report: A 55-year-old female presented to the vertigo clinic of SGT Hospital Gurgaon with giddiness for a week. She had history of vaginal hysterectomy 2 weeks prior and was an inpatient of the hospital for the same period. After assessment her right supine roll test showed apogeotropic nystagmus, on-direction changing that is supine roll to left shows apogeotropic nystagmus toward right ear indicative of a right horizontal canal cupulolithiasis. Dix Hallpike Test was negative. Patient was treated with Gufoni and Appiani manoeuvre and no nystagmus was observed. Patient was discharged on tablet vertin 16mg three times a day for a week.

Discussion: Horizontal Canal-BPPV is attributed to either cupulolithiasis or canaloithiasis within the anterior arm of the horizontal canal. Cupulolithiasis itself may be canal sided or utricular sided.⁵ The case report discussed we have diagnosed the patient to have right horizontal canal cupulolithiasis utricular side. the supine roll test, in which the patient's head is turned about 90° to each side while supine. This manoeuvre can induce Apogeotropic or geotropic nystagmus suggestive of HC-BPPV. The prevalence of horizontal canal BPPV (HC-BPPV) may be much more than previously thought.⁸ Hormonal factors may play a

role in development of BPPV and its highly prevalent in middle aged women.⁹

The combination of therapeutic manoeuvres like Gufoni and appiani are used to treat and correct horizontal canal cupulolithiasis.

Conclusion: Mcgure Pagani test or supine roll test is the most commonly ignored test in any vertigo clinic. To diagnose horizontal canal pathology supine roll test is absolutely necessary, especially in recumbent patients' evaluation does not end with dix Hallpike should include supine roll test.

KEYWORDS: Apogeotropic nystagmus, horizontal canal BPPV, supine roll test.

I. INTRODUCTION

One of the most common causes of vertigo is BPPV and it accounts for approximately 20% of vertigo patients.^{1,2} It is characterized by brief dizziness and nystagmus induced by a change in head position with respect to gravity. Middle-aged and elderly people are more commonly affected by this condition. Usually patients present with vertigo sometimes accompanied by temporary nausea and vomiting, lasting not >1 min, they generally do not complain of any symptoms like tinnitus and hearing loss.

Head trauma, prolonged lying position and various conditions in the inner ear can be causes of BPPV.^{1,2}

The pathophysiological process of BPPV is that calcium carbonate particles located on the otolith membrane of the elliptical capsule fall off and enter the semicircular canal. The three types of BPPV are posterior canal (PC-BPPV) and horizontal canal (HC-BPPV) and anterior canal (AC-BPPV).³



Posterior canal BPPV (P-BPPV) accounts for most BPPV cases and can be treated using a simple and effective method, the Epley manoeuvre⁴.

Nystagmus patterns can be classified based on direction, there can be horizontal or vertical. Horizontal nystagmus that may beat toward the ground (geotropic form) or toward the ceiling (apogeotropic form).

The supine roll test, in which the patient's head is turned about 90° to each side while supine, this manoeuvre can induce apogeotropic or geotropic nystagmus suggestive of HC-BPPV.

HC-BPPV is attributed to either cupulolithiasis or canolithiasis within the anterior arm of the horizontal canal. Cupulolithiasis itself may be canal sided or utricular sided.⁵

BPPV develops mostly in the posterior (90% of cases) and only (5-30% of cases) in horizontal semicircular canals.^{6,7} The prevalence of horizontal canal BPPV (HC-BPPV) may be much more than previously thought.⁸ Hormonal factors may play a role in development of BPPV and its highly prevalent in middle aged women.⁹

Poorer treatment outcomes are reported in the cupulolithiasis of horizontal semicircular canal than canal lithiasis following canalith repositioning maneuvers.^{10,11}

It is attributed to the difficulty in determining to which side of the cupula the otolith particles are attached to.¹²

Hence here we discuss a case report of a patient developing apogeotropic nystagmus on supine roll test post hysterectomy as horizontal canal BPPV is not commonly endured in clinical practise in a patient in prolonged lying position.

Although BPPV is a self-limiting disease with good prognosis, persistent untreated BPPV may seriously affect patients' daily life.¹

II. CASE REPORT

A 55-year-old female presented with complaints of giddiness for 1-week, rotatory type of giddiness each episode lasting for 30 secs, associated with positional change and episodes of sweating. Patient had a history of vaginal hysterectomy, 1 week ago and the complaints started post operatively. Patient is a known case of hypertensive and was on treatment for the same. No history of hearing loss, tinnitus, or loss of consciousness.

Patient was alert and conscious. On examination right ear grade 1 retraction noted on tympanic membrane. Left tympanic membrane appears normal. Remaining nose and throat examination appears normal. Tuning fork tests were normal. Fistula test is negative. Head impulse test is normal. No skew deviation of eyes noted. No spontaneous or gaze evoked nystagmus noted. No abnormality on testing saccades and pursuit in horizontal and vertical direction.

No diplopia noted, Neurological evaluation appears normal. Finger nose test and dysdiadochokinesia test is normal bilaterally. Romberg's test is normal.

On supine roll test on right side, left beating nystagmus noted -apogeotropic non direction changing nystagmus noted.

Left side supine roll test nystagmus was beating towards the right ear or uppermost ear with higher intensity.

Bilateral dix hall pike test is negative to rule out involvement of the posterior canals. Patient underwent gufoni manoeuvre followed by appiani manoeuvre. Resolution of nystagmus was noted after the manoeuvre. Patient was discharged on tablet Vertin 16mg three times a day for a week.

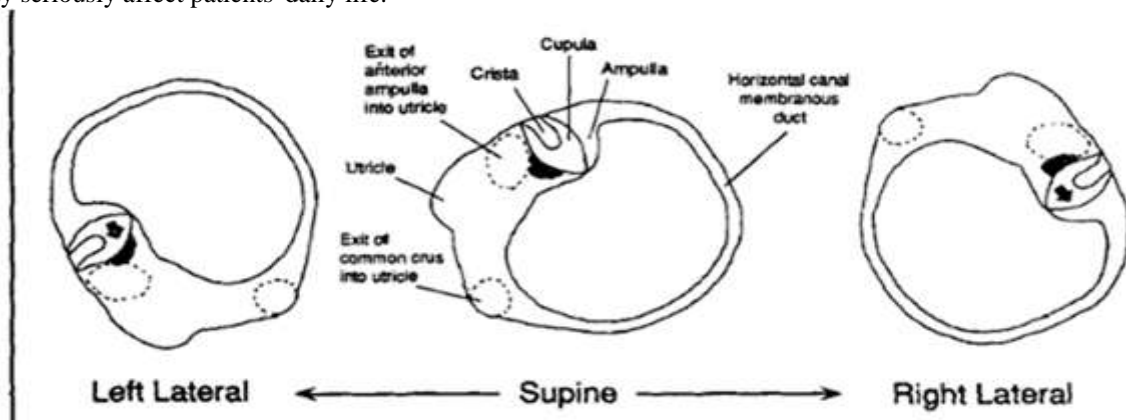


Figure 1 Baloh RW, Yue Q, Jacobson KM, Honrubia V. Persistent direction-changing positional nystagmus: another variant of benign positional nystagmus?. *Neurology*. 1995;45(7):1297-1301. doi:10.1212/wnl.45.7.1297



III. DISCUSSION:

BPPV is a mechanical disorder of the inner ear in which positioning of the head precipitates an abnormal stimulation, usually of the posterior, rarely of the horizontal, semicircular canal.¹³

Based on the semicircular canals involved BPPV is further classified. Posterior canal BPPV (P-BPPV) accounts for most BPPV cases and can be treated using a simple and effective method, the Epley manoeuvre¹⁴

HC-BPPV is attributed to either cupulolithiasis or canalolithiasis within the anterior arm of the horizontal canal. Cupulolithiasis itself may be canal sided or utricular sided.⁵

The case report discussed we have diagnosed the patient to have right horizontal canal cupulolithiasis utricular side.

The supine roll test, in which the patient's head is turned about 90° to each side while supine, can induce apogeotropic or geotropic nystagmus suggestive of HC-BPPV

There can be horizontal or vertical, horizontal nystagmus that may beat toward the ground (geotropic form) or toward the ceiling (apogeotropic form).

In cupulolithiasis type LSCC BPPV, otolith particles attached to the cupula make the LSCC gravity sensitive¹²

The direction-changing positional nystagmus in our patients can be explained by the proposed mechanism, the subject lying supine, the horizontal canal cupula is at a vertical position at the top of the circular ring so that the attached mass would not lead to a deviation of the cupula (fig 1). When the patient turns to the abnormal side (the right side in the figure), the mass on top of the cupula causes it to deviate away from the utricle this results in inhibition of the horizontal canal ampullary nerve on that side and nystagmus is produced away from the undermost ear. The opposite would occur when the patient turns onto the other side, the side of the normal ear. In this case, cupula deviates toward the utricle, also producing nystagmus beating away from the ground. while the mass remain attached to the cupula Thenystagmus persists as long as the position is held.¹⁵

Similar to our case study Steddin et al reported a 69-year-old female patient presented with right-sided BPPV of the horizontal canal attack had occurred after a hysterectomy 3 months previously. In the supine position with her head turned to either the right or the left side, vertigo and nystagmus began, no latency noted and had a duration of 60 to 80 seconds. Pronounced attacks

were seen when the head was turned to the right side; the patient vomited during testing. Repeated testing showed no fatigue. No signs of a central neurologic disorder, no hearing loss or tinnitus. Computed tomographic scans and electronystagmography were normal. Caloric testing showed a hypo excitability of the right horizontal canal. The patient was treated and left the hospital after 6 days, completely free of BPPV, with normal bilateral responses to caloric irrigation.¹³

Poorer treatment outcomes have been reported in cupulolithiasis than canalolithiasis following canalith repositioning maneuvers^{10,11}.

It is attributed to the difficulty in determining which side of the cupula the otolith particles are attached to. according to the location of otolith attachment different therapeutic approaches should be applied. during a diagnostic manoeuvre identifying the side of attachment is difficult. therapeutic approaches attempting to resolve both sides of the cupula provide better outcomes.¹⁶

The limitation of this study is that only one case were included in the present study, and a study of more cases may be needed to draw more valid conclusion.

LSCC cupulolithiasis should include manoeuvres to detach otolith particles from both the utricle and canal side of the cupula for better outcomes.¹²

This case we treated the patient with Gufoni manoeuvre because of the persistent nature of the apogeotropic nystagmus followed by Appiani Manoeuvre.

The Gufoni manoeuvre was performed as follows the patient was seated in the centre of the table (Figure 2A-1), the patient was brought head down on the affected side (Figure 2A-2); then head was quickly turned downwards at 45 and held for 2 to 3 minutes in that position (Figure 2A-3); patient was then returned to the starting position (Figure 2A-4).

The Appiani manoeuvre was performed as follows, the patient was seated in the centre of the table (Figure 2B-1); the patient was moved into a side-lying position on the affected side and kept in that position for 1 minute (Figure 2B-2) the head was then turned upwards at 45 (Figure 2B-3), patient was then returned to the starting position (Figure 2A-4)¹⁷.

Manoeuvres for HSCC cupulolithiasis helps in detaching the otolithic debris, which can be attached either on the utricular or canal side of the cupula. When debris is attached to the utricular side of the cupula, detachment of otolith debris



results in immediate resolution of positional vertigo and nystagmus. Gufoni proposed a repositioning manoeuvre to detach the otolithic debris on the utricular side using gravity and inertia of the particles, which was also called a modified Semont maneuver. The movement from the seated position to lateral decubitus on the affected side, displace otolith debris into the utricle.¹⁷

In 2005, Vannucchi et al reported that, in 43 patients with ageotropic HSCC BPPV, 5 (11.6%) patients were symptom free after doing 1 session of Gufoni manoeuvre, whereas 28 (65.1%) patients the nystagmus changed into geotropic form. However, the authors mainly included patients with transient (notpersistent) apogeotropic

nystagmus, meaning that most of them had canalithiasis mechanism.¹⁸

Their high nystagmus switching rate (65.1%) may be attributed to this canalithiasis dominant patients characteristics.

In the second step of the Gufoni manoeuvre, gravitational force may cause the debris from the ampulla to go into the posterior arm of the LSCC, which results in nystagmus switching from ageotropic into geotropic form. As described in the third step of the Appiani manoeuvre (brisk headturn 45° upward) the debris is repushed into the ampulla from posterior arm of LSCC.¹⁷

Hence therapeutic approaches attempting to resolve both sides of the cupula provide better outcomes.¹²

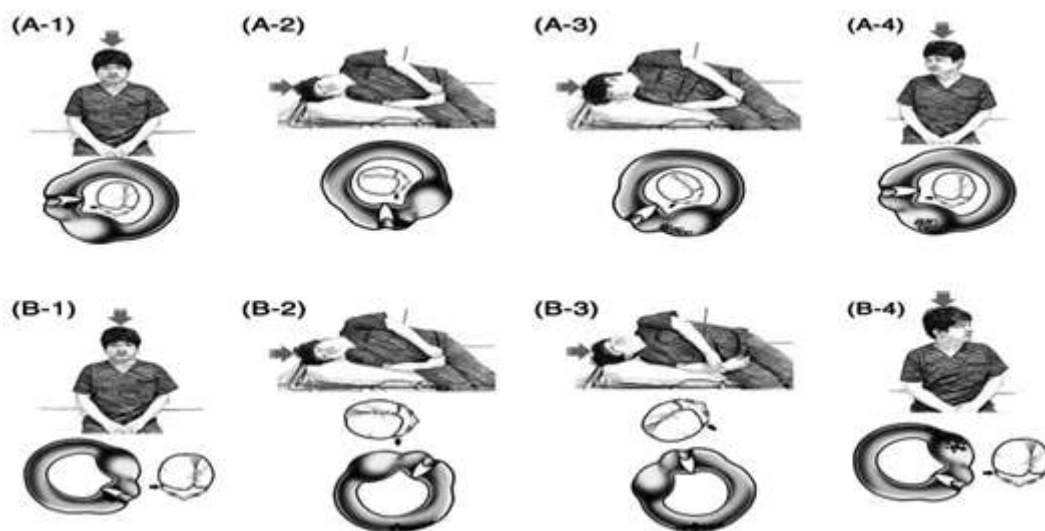


Figure 2: Baloh RW, Yue Q, Jacobson KM, Honrubia V. Persistent direction-changing positional nystagmus: another variant of benign positional nystagmus?. *Neurology*. 1995;45(7):1297-1301. doi:10.1212/wnl.45.7.1297

IV. CONCLUSION

In a patient presenting with LSCC BPPV the main dilemma faced is diagnosing the right pathology and applying the exact manoeuvre arrive at diagnosis is a difficult exercise; and most of the evaluation ends on performing Dix Hallpike test which does not bring out pathology in the horizontal SCC.

Hence performing a Supine roll test is mandatory in all patients complaining of rotatory giddiness and a combination of therapeutic manoeuvres like Gufoni and Appiani manoeuvre is required for the correct treatment of patients.

Physicians should include supine roll test and Dix Hallpike test as a part of routine clinical evaluation of patients complaining of rotatory giddiness especially in recumbent patients.

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