

CASE REPORT**Why continuous nystagmus monitoring matters during treatment of posterior canal BPPV: A case report****Shreya Vats¹, Ajay Kumar Vats², Ramesh Rohiwal³, Sudhir Kothari⁴**¹Otoneurology, Centre, Rajasthan, India.²ShantiRaj Hospital, Kesar Kunj, New Bhupal Pura, India.³Care Ciigma Hospital, Chatrapati Sambhajinagar, Maharashtra, India.⁴Poona Hospital and Research Centre, Pune, Maharashtra, India.**Correspondence**Ajay Kumar Vats
ShantiRaj Hospital, Kesar Kunj,
New Bhupal Pura, India.E-mail: vatsneuro@gmail.com**Abstract**

Benign paroxysmal positional vertigo (BPPV) due to posterior semicircular canalolithiasis is the most common vestibular disorder, effectively treated with canalith repositioning maneuvers like the Epley maneuver. However, treatment-related complications such as canal switch and canalith jam can occur, necessitating vigilant monitoring of nystagmus. We report a 71-year-old woman who presented with positional vertigo diagnosed as left periampullary posterior canal BPPV. Post-Epley maneuver, she developed spontaneous right-beating nystagmus indicative of canal switch to horizontal semicircular canal with immediate canalith jam, resolved by therapeutic head shaking. The switch to left horizontal canal BPPV (geotropic), was treated with the Gufoni maneuver. Subsequently, a re-switch to non-ampullary arm of posterior canal BPPV occurred, managed with mastoid-augmented demi-Semont maneuver and 45 degrees forced prolonged positioning. Complete resolution was achieved within 24 hours, with negative Dix-Hallpike test. This case underscores the critical role of continuous nystagmus observation during and after repositioning to detect and address rare complications promptly, preventing prolonged symptoms.

KEYWORDS

Benign paroxysmal positional vertigo, Canalolithiasis; Epley maneuver, Canalith jam; Canal switch, Nystagmus

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) accounts for approximately 20-30% of vertigo cases in clinical practice and is characterised by brief episodes of vertigo triggered by head position changes.¹ The most prevalent form involves the posterior semicircular canal (PC-BPPV), comprising about 85% of cases, attributed to canalolithiasis where free-floating otoconia enter the posterior semicircular canal endolymph, causing ampullofugal deflection of the cupula during positional testing.² The particle repositioning Epley manoeuvre (EM) achieves resolution in over 90% of

patients with a single session.³ Despite its efficacy, rare complications such as canalith jam, where otoconial debris obstructs endolymph flow, leading to persistent nystagmus, and canal conversion (switch) to adjacent canals like the horizontal semicircular canal (HC-BPPV) or non-ampullary arm of the posterior canal can arise, occurring uncommonly^{4,5}. These iatrogenic shifts highlight the importance of post-manoeuvre nystagmus surveillance to guide sequential interventions. This case illustrates a cascade of such complications in periampullary PC-BPPV, emphasizing how meticulous eye monitoring facilitates timely diagnosis and treatment.



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CASE PRESENTATION

A 71-year-old woman with no significant past medical history presented to our neurology clinic on March 18, 2025, complaining of a 2-day history of severe vertigo provoked by head movements relative to gravity, particularly upon rising from the supine position or rolling to the left lateral decubitus. Symptoms were not associated with hearing loss, tinnitus, headache, or focal neurological deficits. On examination, the left Dix-Hallpike test (DHT) evoked left torsional upbeating nystagmus lasting 45 seconds, consistent with left periaampullary posterior semicircular canalolithiasis (PC-BPPV). The right DHT, and supine roll test were negative, with no spontaneous nystagmus at rest.

A standard left EM was performed immediately. One hour after the procedure, re-evaluation showed spontaneous right-beating horizontal nystagmus at rest, suggestive of a canal switch with immediate canalith jam in the horizontal semicircular canal (Figure 1). Vigorous therapeutic head shaking for 30 seconds in the sitting position reversed the nystagmus to left-beating horizontal, indicating dislodgement of the jammed debris (Figure 2).

Subsequent supine roll testing elicited geotropic horizontal positional nystagmus on both leftward and rightward head rolls, more intense on the leftward roll, diagnostic of left

long posterior non-ampullary arm horizontal semicircular canalolithiasis (HC-BPPV). The Gufoni manoeuvre was executed, involving rapid rotation to the unaffected side followed by nose-down positioning for 2 minutes (Figure 3).^{6,7} No immediate nystagmus was observed post-maneuver.

Twenty-four hours later, the patient reported residual imbalance but no overt vertigo. Repeat left DHT provoked slow crescendo-decrescendo downbeating nystagmus with a right torsional component, lasting 30-40 seconds, indicative of a switch to left non-ampullary arm posterior semicircular canalolithiasis (non-ampullary arm PC-BPPV).⁸ Three cycles of mastoid-augmented demi-Semont maneuver were performed, targeting the non-ampullary arm of left posterior semicircular canal, followed by 1 hour of forced prolonged positioning at 45 degrees toward the right side to facilitate debris migration toward the utricle.^{8,9} Four hours later, the left DHT was negative, with no spontaneous or positional nystagmus, and the patient was fully asymptomatic.¹⁰ Oculomotor responses generated during sequential positional tests are accessible.¹¹ Informed consent for publication was obtained from the patient. No ethical committee approval was required as per institutional guidelines for single case reports.

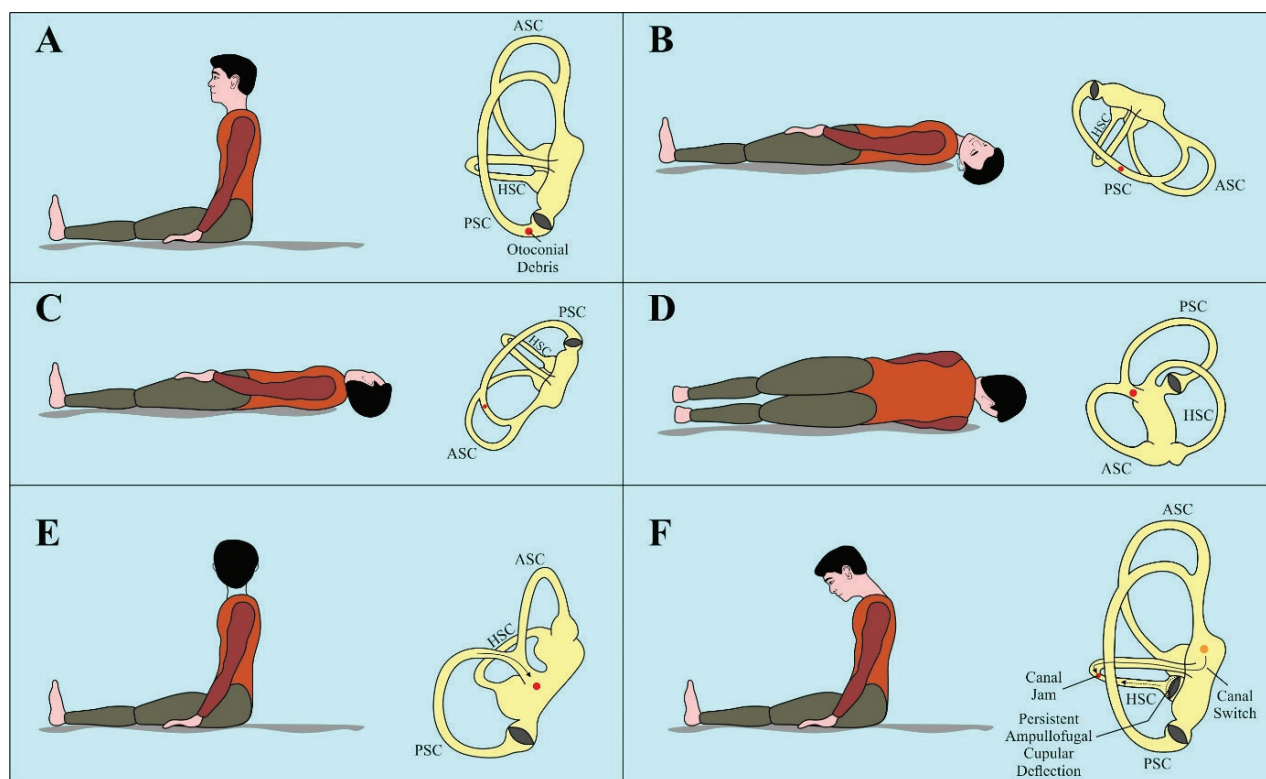


FIGURE 1. Periaampullary otoconia in the left posterior semicircular canal (1A) migrate toward the common crus during positions 2-4 of the left Epley maneuver (1B-D). On uprighting after position 4, the debris, instead of entering the utricle, passes into the long non-ampullary arm of the left horizontal semicircular canal and becomes jammed.

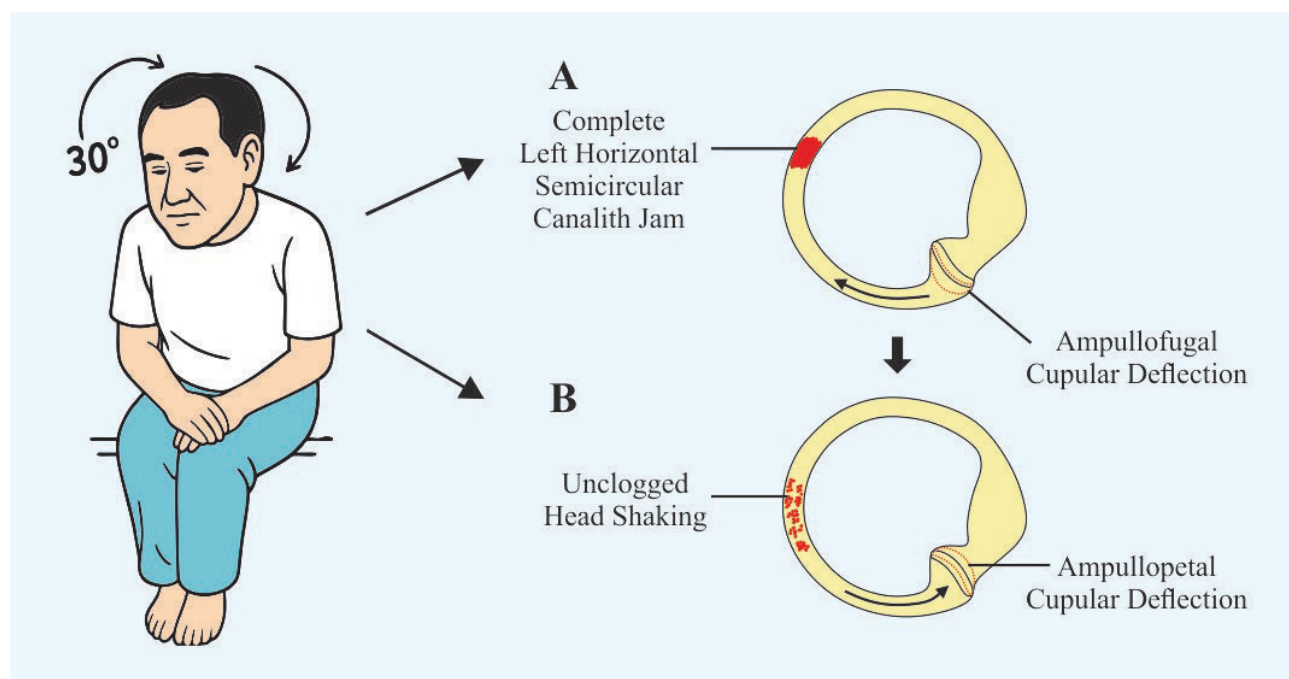


FIGURE 2. Complete canalith jam in the left horizontal semicircular canal, occurring during ampullofugal cupular deflection, produces right-beating horizontal nystagmus (2A). Head shaking at three cycles per second with 30° head anteflexion dislodges the jam, with successful dispersion indicated by reversal to left-beating horizontal nystagmus after head shaking.

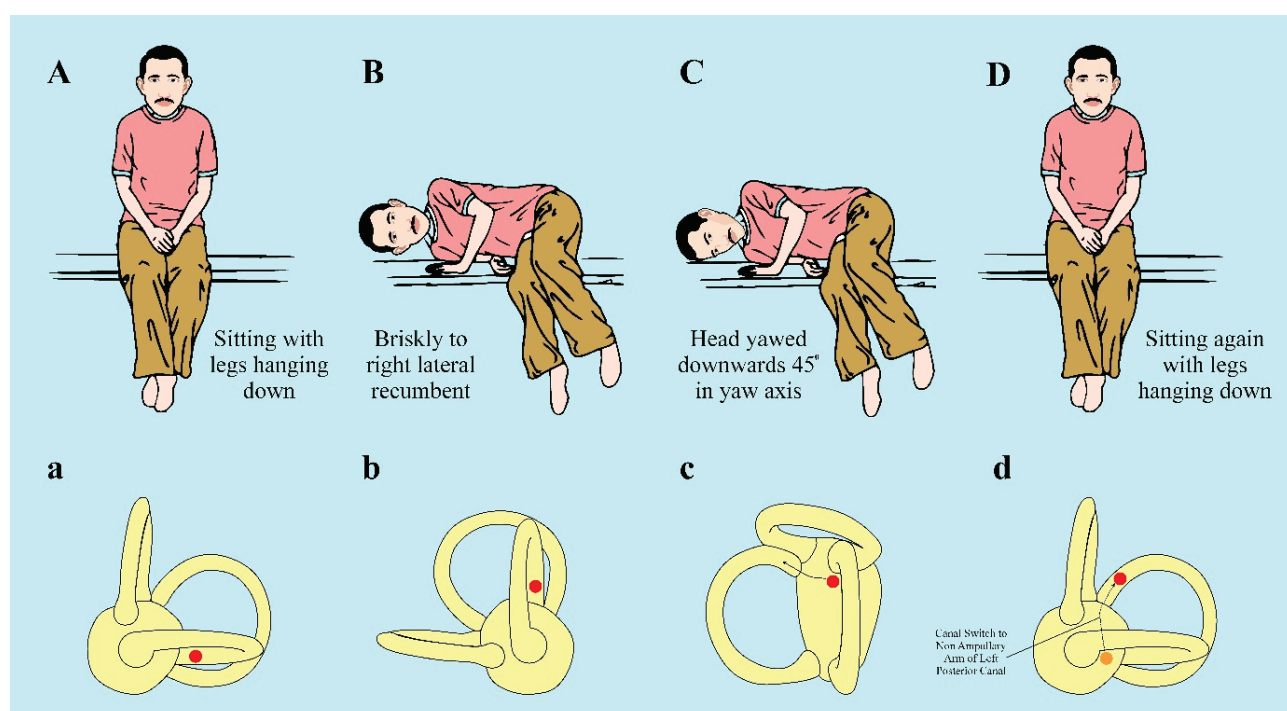


FIGURE 3. Gufoni manoeuvre: From short sitting (3A), the patient is rapidly moved to the lateral recumbent position on the non-involved side for 1 minute (3B). The head is then rotated 45° downward for 2 minutes (3C) and returned to upright (3D). Lower panel (a-d) shows otoconial debris moving from the long non-ampullary arm of the left horizontal semicircular canal to the non-ampullary arm of the left posterior semicircular canal.

DISCUSSION

This case exemplifies the diagnostic and therapeutic challenges in managing PC-BPPV when treatment induces sequential complications, underscoring the necessity of continuous nystagmus observation. Initial presentation aligned with classic periampullary PC-BPPV, where otoconia in the long arm elicit characteristic ipsitorsional upbeating nystagmus on DHT. The EM aims to guide debris through the posterior canal toward the utricle, but in rare cases, it may result in canal switch with immediate canalith jam, a mechanical obstruction by aggregated otoliths blocking endolymph flow, resulting in persistent direction-fixed nystagmus. The observed spontaneous right-beating nystagmus post-EM likely represented this jam, reversed by head shaking, which generates inertial forces to liberate the debris without further canal migration.

The ensuing geotropic HC-BPPV, with stronger nystagmus on the affected side head roll, suggests free floating debris within the long posterior non-ampullary arm of the horizontal canal during dislodgement, a canal switch reported uncommonly in repositioned PC-BPPV cases. Geotropic variant implies free-floating canaliths, amenable to the Gufoni maneuver, which leverages gravity to extract otoliths via the long posterior non-ampullary arm. Finally, hitherto unreported re-switch to non-ampullary PC-BPPV manifested as downbeating nystagmus with contratorsional features, as debris in the posterior arm near the common crus produces ampullopetal deflection. The demi-Semont manoeuvre, augmented by mastoid oscillations to enhance particle mobilisation, combined with post-manoeuve forced prolonged positioning, effectively resolved this atypical form.

While PC-BPPV boasts high EM success, unmonitored complications prolong morbidity, as seen in refractory cases. This patient's rapid resolution (within 28 hours) versus typical delays in undetected switches highlights the value of immediate post-treatment observation, with reassessment at 24 hours preferred over 1 hour.

Take home messages

- Persistent direction-fixed or direction-changing horizontal positional nystagmus post-Epley repositioning mandates immediate re-evaluation to identify canal switch with immediate canalith jam treatable through simple bedside maneuvers like head shaking followed by Gufoni.
- Routine nystagmus monitoring during BPPV treatment, even in the “commonest” forms, prevents iatrogenic escalation and ensures optimal outcomes.

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