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Case Report

Benign Paroxysmal Positional Vertigo due to Spinal Surgery: A Case Report

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- Spinal surgery
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Abstract

Background: Benign paroxysmal positional vertigo (BPPV) is a common vestibular disorder. BPPV may be due to surgery, but it is a rare complication of non-craniofacial surgery. Diagnosis and treatment of BPPV remain challenging in postoperative patients. We present a case of BPPV secondary to spinal surgery and the diagnostic and treatment outcomes. The possible underlying etiologic and pathophysiologic mechanisms in this condition are also discussed.

Case presentation: A 61-year-old woman underwent spinal surgery for lumbosacral spinal stenosis and disc herniation. Day one postoperatively the patient developed BPPV involving the right horizontal canal which was diagnosed by device-assisted roll test. The patient was treated with device-assisted and modified roll repositioning maneuver. Complete resolution of vertigo and nystagmus after the repositioning maneuver with no recurrence of BPPV after 18 months of follow-up.

Conclusions: BPPV is a rare but possible complication of spinal surgery. The device-assisted maneuvers can be helpful for the diagnosis and repositioning treatment of BPPV in postoperative patients with physical limitations, with good efficacy.

ABBREVIATIONS

BPPV: Benign Paroxysmal Positional Vertigo

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is a common vestibular disorder characterized by repeated episodes of vertigo induced by changes in head position and is also the most common cause of vertigo, with a lifetime prevalence of 2.4% in the general population [1,2]. The etiology and pathophysiology of BPPV have not been fully understood. Most cases are idiopathic and some have identifiable causes [3]. BPPV due to surgery has been described in the literature, which occurs commonly after craniofacial surgery, especially ear surgery [3,4] or dental and maxillary surgery [5,6], but rarely following non-craniofacial surgery. Up to now, there are only six cases of BPPV following non-craniofacial surgery reported in literature [4,7]. BPPV due to spinal surgery has never been reported. It is believed that BPPV occurs when otoconia detach from the macula of the utricle and enter the semicircular canal. The dislodged otolith particles, either free-moving in the canal (canalithiasis) or depositing on the cupula of the canal (cupulolithiasis), may induce the onset of vertigo and nystagmus with head position changes [1-3].

BPPV is commonly diagnosed based on a history of episodic vertigo associated with head position changes and the characteristic nystagmus provoked by specific diagnostic maneuvers [1,2]. Although BPPV is a self-limited disease with a favorable prognosis, persistent untreated BPPV may impact function, health, and the quality of life of patients, therefore, patients can benefit from prompt treatment of BPPV [1]. Various particle repositioning maneuvers, which aim at making the dislodged otoconia free-moving in the canal or depositing on the cupula back to the utricle to relieve vertigo symptom, have been used to treat BPPV, with good efficacies [1,2]. However, the diagnosis or treatment of BPPV in postoperative patients is challenging as the use of manual diagnostic and therapeutic positioning maneuvers is commonly limited in these patients due to physical limitations [1,8]. Some devices have been developed to diagnose and treat BPPV with promising results [8-10]. We present herein a rare case of BPPV due to spinal surgery, with successful diagnosis and treatment outcomes by device-assisted diagnostic and therapeutic maneuvers (Figure 1).

Figure 1 The device-assisted roll test for the diagnosis of right horizontal canal benign paroxysmal positional vertigo. Apogeotropic direction-changing horizontal nystagmus is shown in the patient after spinal surgery. (A) Nystagmus toward the right when rolling the patient to the left from (B) the neutral position, and (C) nystagmus toward the left when rolling the patient to the right from the neutral position, with less intense nystagmus on rolling patient to the right than to the left.

CASE PRESENTATION

A 61-year-old woman presented to the Department of Orthopedics, Air Force General Hospital, Beijing, China, with a three-year history of low back pain and radicular lower limb pain. Spinal stenosis and the disc herniation at the L5-S1 were diagnosed on lumbosacral CT and MRI. The patient, in prone position with face to the left, underwent spinal surgery under general anesthesia. The series of surgical procedures included decompressive laminectomy, corpectomy, and posterior lumbar spinal fusion with pedicle screw fixation. The entire surgery lasted more than six hours with 900 ml bleeding intraoperatively. The surgery was completed without any immediate intraoperative or postoperative complications. However day one postoperatively, the patient described the symptoms of repeated episodic vertigo associated with nausea and vomiting when she rolled over in bed, with each episode of vertigo lasting one or two minutes, but not with abnormal hearing, tinnitus, or other neurologic symptoms. The patient had no past history of vertigo.

With assistance from the otolaryngology service, neurologic examination yielded unremarkable findings and otological examination revealed normal ear canals and tympani membranes, but a direction-changing horizontal nystagmus was demonstrated on the supine roll test. The Dix-Hallpike test was not preformed because of physical limitations. The patient was suggested to have BPPV, however she was only a candidate for medical treatment in view of physical limitations. Unfortunately there was no significant resolution of vertigo with medical treatment for days. Six days postoperatively, the patient was evaluated with device-assisted diagnostic tests for BPPV. The Dix-Hallpike test was negative, while the roll test showed an apogeotropic direction-changing horizontal nystagmus, which always beat towards the uppermost ear when the head was turned to the left or right side (Figure 1). The right ear was presumed as the affected side due to the presence of less intense nystagmus when the head turned to the right than the left (both with no latency, duration: 70s vs. 82s, and velocity: 9.7°/s vs. 12.8°/s). Thus apogeotropic type (cupulolithiasis) of BPPV involving the right horizontal semicircular canal was diagnosed, and the patient was subsequently treated with the device-assisted and modified roll repositioning maneuver that comprised three sequential 360-degree rotations as described in our previous study [10]. The patient reported complete resolution of BPPV after the maneuver and was discharged two days later without any problems. During next 18 months of follow-up she had no recurrence of BPPV.

DISCUSSION

BPPV is not commonly secondary to non-craniofacial surgery. Up to now, only six cases of BPPV following non-craniofacial surgery are reported worldwide [4,7]. A previous study demonstrated that five of 240 BPPV cases were secondary to non-craniofacial surgery including three patients with cardiac surgery and two patients with abdominal surgery [4]. Recently a case of BPPV secondary to laparoscopic hysterectomy was reported [7]. BPPV due to spinal surgery has not previously been reported. This case report shows that BPPV may also be a rare but possible complication of spinal surgery.

The exact etiologic component and pathogenic mechanism for this case of BPPV could not be elucidated well and there were possibly several contributing factors. Firstly, percussions and vibrations on spinal bony structures could be a primary etiological factor for BPPV. Some studies show that vibratory and percussive forces during osteotome on craniofacial bony structures contribute to the development of BPPV [5,6]. In this patient's surgical procedure, osteotomes with hammer and chisel were used for removal of partial bony structures and osteotome-produced percussive and vibratory forces, propagating through the spinal bony structures up to the labyrinth, could lead to the otoconia to detach from the utricle macula and to enter the gravity-dependent semicircular canal and further to deposit on the cupula, consequently causing BPPV. Secondly, ischemia and hypoperfusion of the inner ear possibly caused by bleeding during surgery could be another etiological factor for BPPV. The study of Baloh et al., demonstrated that the five patients with BPPV secondary to abdominal or cardiac surgery did not have documented complications at the time of surgery to account for the associated BPPV. The authors thought that brief hypotention and hypoperfusion of the inner ear possibly occurred in these cases, and that ischemic damage to inner ear could cause the otoconia to detach from the macula of the utricle and to enter the semicircular canal, leading to the development of BPPV [4]. Thirdly, the prolonged forced head position during surgery could be additional factor contributing to BPPV in our patient, because this could increase the risk of the dislocated otoconia to enter the semicircular canal and to deposit on the cupula, resulting in BPPV [5,6]. Recently Khan et al. reported a case of BPPV secondary to laparoscopic hysterectomy and steep Trendelenburg position during surgery was considered a triggering factor for BPPV developing in their patient [7]. Lastly, the patient's age could also be additional factor contributing to her BPPV, as BPPV is more

common in elderly patients [11,12]. The age-related deteriorative changes in the otolith organs may be related to the increased prevalence of BPPV in the older people [11].

The diagnosis and treatment of BPPV in postoperative patients is challenging for both patients and clinicians because the use of diagnostic and therapeutic positioning maneuvers is commonly limited in these patients due to physical limitations [7]. However, these maneuvers may be performed with some devices [8-10], which are able to overcome physical limitations allowing those patients, such as postoperative patients, be diagnosed and treated appropriately. A recent report showed that a 96-year-old patient with intractable BPPV due to the presence of pubic fracture was treated successfully by the Epley maneuver performed with a motorized turntable [8]. Our report showed that with the assistance of the diagnostic and therapeutic device for BPPV, the postoperative patient was diagnosed and treated successfully. We believe that postoperative patients with BPPV can receive device-assisted diagnostic and therapeutic positioning maneuvers as tolerated.

CONCLUSIONS

To our knowledge, BPPV due to spinal surgery has not yet been reported. This case report demonstrates that BPPV is a rare but possible complication of spinal surgery. Although the etiologic and pathogenic mechanisms for this case is not entirely clear, patients can benefit from early diagnosis and treatment of BPPV. Device-assisted repositioning maneuver can be a good choice of treatment for BPPV in postoperative patients with physical limitations, with good efficacy and prognosis.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

REFERENCES

1. Bhattacharyya N, Baugh RF, Orvidas L, Barrs D, Bronston LJ, Cass S, et al. Clinical practice guideline: benign paroxysmal positional vertigo. Otolaryngol Head Neck Surg. 2008; 139: S47-81.
2. Kim JS, Zee DS. Clinical practice. Benign paroxysmal positional vertigo. N Engl J Med. 2014; 370: 1138-1147.
3. Parnes LS, Agrawal SK, Atlas J. Diagnosis and management of benign paroxysmal positional vertigo (BPPV). CMAJ. 2003; 169: 681-693.
4. Baloh RW, Honrubia V, Jacobson K. Benign positional vertigo: clinical and oculographic features in 240 cases. Neurology. 1987; 37: 371-378.
5. Di Girolamo M, Napolitano B, Arullani CA, Bruno E, Di Girolamo S. Paroxysmal positional vertigo as a complication of osteotome sinus floor elevation. Eur Arch Otorhinolaryngol. 2005; 262: 631-633.
6. Sammartino G, Mariniello M, Scaravilli MS. Benign paroxysmal positional vertigo following closed sinus floor elevation procedure: mallet osteotomes vs. screwable osteotomes. A triple blind randomized controlled trial. Clin Oral Implants Res. 2011; 22: 669-72.
7. Khan J, Gill M, Clarke H. Onset of benign paroxysmal positional vertigo after total laparoscopic hysterectomy in the Trendelenburg position. J Minim Invasive Gynecol. 2012; 19: 798-800.
8. Bockisch CJ, Straumann D, Weber KP. Curing a 96-year-old patient afflicted with benign paroxysmal positional vertigo on a motorized turntable. Clin Interv Aging. 2014; 9: 589-591.
9. Nakayama M, Epley JM. BPPV and variants: improved treatment results with automated, nystagmus-based repositioning. Otolaryngol Head Neck Surg. 2005; 133: 107-112.
10. Shan X, Peng X, Wang E. Efficacy of Computer-Controlled and Modified Roll Maneuver for Treatment of Geotropic Lateral Canal Benign Paroxysmal Positional Vertigo. Otol Neurotol. 2015; 36: 1412-1416.
11. Iwasaki S, Yamasoba T. Dizziness and Imbalance in the Elderly: Age-related Decline in the Vestibular System. Aging Dis. 2014; 6: 38-47.
12. Parham K, Kuchel GA. A Geriatric Perspective on Benign Paroxysmal Positional Vertigo. J Am Geriatr Soc. 2016; 64: 378-385.

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