Abstract The canalith repositioning maneuver (CRM), as defined by Epley, can be an effective treatment for benign paroxysmal positional vertigo (BPPV). The staff at Bağkent University’s Ear Nose and Throat Clinic performed CRM on 68 cases of canalithiasis in 64 BPPV patients from June 1996 to August 1997. Symptoms resolved after the first session in 49 patients (72%) and after the second session in 11 cases (16.2%). It was necessary to repeat the maneuver three times in two cases (2.9%) and four times in one patient (1.5%). Discounting three patients who were lost to follow-up, only two patients in our study did not respond to CRM treatment. There was no co-existing pathology found in all but two of the patients studied. Our experience indicates that unless there is no response to CRM or there is suspicion of an incorrect diagnosis, it is not necessary to perform diagnostic studies routinely for differentiating other neuro-otologic disorders prior to using CRM in BPPV patients diagnosed by the Dix-Hallpike test.

Key words Benign paroxysmal positional vertigo · Canalith repositioning maneuver

Introduction

Benign paroxysmal positional vertigo (BPPV) is a self-limiting condition that is characterized by vertigo and nystagmus induced by certain head positions. Among the various theories proposed since the original identification of BPPV by Dix and Hallpike, the “canalithiasis theory” described by Hall et al. [8] in 1979 provides the most widely accepted explanation of this condition today. According to this theory, the likely cause of the syndrome is a free-floating density of inorganic particles, of which a tiny mass is heavier than endolymph in the ampullofugal branch of the semicircular canals. The clinical profile of this condition includes concomitant nystagmus and indicates involvement of the posterior semicircular canal.

Until the completion of more recent studies on the pathophysiology of BPPV, a variety of treatment modalities has been used in patients with BPPV. Since there is still no proven effective pharmacotherapy [2, 12], the most effective means of controlling vertigo has been avoidance of the specific head movements inducing the attacks [12]. Brandt and Daroff [3] have recommended a vigorous course of physiotherapy under heavy sedation during hospitalization. Surgical intervention, such as singular neurectomy [6, 7], posterior canal occlusion [15], vestibular neurectomy [1], and labyrinthectomy [1], have all been recommended for intractable cases when symptoms have been severe enough to have a significant adverse effect on a patient’s life. However, since BPPV is usually self-limiting and the results have been excellent in controlling symptoms, the canalith repositioning maneuver defined by Epley [4, 5] is currently the treatment of choice for canalithiasis of the posterior semicircular canal.

Patients and methods

Between June 1996 and August 1997, 64 patients with vertigo were referred to the Bağkent University Ear Nose and Throat Department. All were subsequently diagnosed as having posterior semicircular canalolithiasis and were included in the study. Patients were selected based on the following criteria:

1. The sensation of vertigo caused by head movements or body posture changes on history
2. Positional vertigo and nystagmus brought on by the Dix and Hallpike positioning tests, i.e., rotatory nystagmus with upbeating vertical and horizontal components appearing after a short latent period, directed toward the lowermost ear in the lateral head position, continuing for a limited time and diminishing on repetition of the test

T. Dal · L. N. Özlüoğlu · N. T. Ergin
Bağkent University School of Medicine, Department of Otolaryngology Head and Neck Surgery, Ankara, Turkey
T. Dal (✉)
Bağkent Üniversitesi Tip Fakültesi, 12. Sokak 7/6, 06490 Bahçelievler Ankara, Turkey
e-mail: teomandal@yahoo.com
3. Occurrence of rotary nystagmus of short duration and in the opposite direction after returning the patient to the sitting position.

4. Elimination of possible diseases of central origin through a careful history, examination and diagnostic tests if indicated.

Patients’ ages ranged between 20 and 81 years, the average being 53.4 years. Forty-one of the patients (64%) were female and 23 (36%) male. Thirty-five of the patients (54.7%) were affected on the right side and 28 (43.8%) on the left. Bilateral involvement was diagnosed in only one patient. Subsequent involvement of the posterior semicircular canal on the opposite side was diagnosed by the Dix and Hallpike test and electronystagmography (ENG) during the follow-up of three patients. Patients were also evaluated using pure-tone audiologic tests and caloric tests. Besides inspection of eye movements, ENG recordings were obtained using a two-channel computerized ENG system (IHS Medical Systems) during the positional tests, caloric tests and subsequently the canalith repositioning maneuver (CRM). Further diagnostic tests, evoked response audiometry (ERA) and internal acoustic canal magnetic resonance imaging (MRI) were performed when there was any suspicion of central involvement according to patients’ histories or audiovestibular test results.

A modified CRM, as shown in Fig. 1, was performed on all patients with BPPV. At the beginning of the maneuver, the patient’s head was turned to the side of the affected ear while in the sitting position. The head was then brought into the Dix-Hallpike 45° head-hanging position with the symptomatic side down. After a 3-min rest in this position, the patient’s head was turned slowly to the midline over 1 min. After a 3-min rest in this position, the patient was returned to the normal seated position with the head still turned, as the last step of the maneuver. Nystagmus, if it occurred in any phase of the maneuver, was allowed to resolve completely. A bone vibrator was not used.

Each patient underwent the same CRM procedure, and the maneuver was never repeated during a session. In addition to ENG recordings, eye movements were followed during the maneuvers, and the duration of nystagmus and sensation of vertigo were recorded. Patients were instructed to sleep at home with their heads elevated, without extending the neck and without turning the head to the affected side. Sudden head movements were to be avoided for 48–72 h. All patients returned for a follow-up visit within 2–5 days. In asymptomatic patients if nystagmus or vertigo was absent on Dix-Hallpike maneuver (with inspection and ENG recording), the patient was regarded as cured and advised to return only if symptoms recurred. In symptomatic patients, the Dix-Hallpike test and ENG recordings were performed and CRM was repeated on the asymptomatic side. The CRM was also repeated on asymptomatic patients who still had ENG evidence of BPPV or had BPPV during Dix-Hallpike testing.

Fig. 1 A–E  Illustration of the canalith repositioning maneuver as viewed from the top of the examining table. A The patient’s head is turned toward the symptomatic side (right side in this illustration) while in the sitting position. B The head is brought into the Dix-Hallpike 45° head-hanging position with the affected ear down and kept for 3 min in this position. C The patient’s head is turned slowly to the midline over 1 min. D The head is next turned to the contralateral shoulder and is kept prone prone (180° from the original position) during a 2nd min, after which it is kept for 3 min in this position. E The patient is returned to the seated position slowly with the head still turned (the position of the right labyrinth as viewed from the right lateral side is illustrated with the posterior semicircular canal marked).