Treatment of Benign Paroxysmal Positional Vertigo by Canalith Repositioning Procedure : Experience from Srinagarind Hospital

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Abstract

Introduction : Benign paroxysmal positional vertigo (BPPV) is one of the most common causes of vertigo. The diagnosis is confirmed by observing a classical response during the Dix-Hallpike maneuver. The cause of BPPV is usually idiopathic. There are two popular hypotheses described regarding the pathogenesis of BPPV. The first one is the "cupulolithiasis" hypothesis, and the second hypothesis, the so-called "canalithiasis" hypothesis. The clinical course of BPPV is spontaneous recovery in weeks or months. Treatments for BPPV have ranged from no intervention to surgical treatment. The new treatment, "Canalith-repositioning procedure (CRP)" which was introduced by Epley in 1992 produces a very high rate of success. This treatment has caused interest and has been modified and studied worldwide in recent years.

Objective : To study the efficacy of the canalith-repositioning procedure that we modified from Epley's maneuver in the treatment of BPPV patients.

Design : A descriptive study. The BPPV patients, who came to the neurotologic clinic at Srinagarind Hospital from January 1997 to December 1998, were treated with our technique that was modified from Epley's maneuver. We neither used pre-medication, a mastoid oscillator, nor post-treatment instruction.

Results : The total number of patients included in this study was 19. The efficacy of this procedure for curing nystagmus and vertigo was 89.5 per cent. One patient did not follow-up and one patient did not respond to the CRP. Complication such as vago-vagal reflex, lateral canalithiasis, occurred in 5.3 per cent of the patients. The recurrence of BPPV in our study was 26.3 per cent. However, CRP was also effective in treatment of both patients with recurrence as well as those without recurrence.

Conclusion : The canalith-repositioning procedure that is modified from Epley is effective in the treatment of BPPV.

Key word : Benign Paroxysmal Positional Vertigo, Treatment, Canalith Repositioning Procedure

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BPPV is one of the most common causes of vertigo. It is characterized by a sudden onset of dizziness or vertigo that is precipitated by specific movements such as: lying down; rolling over in bed; sitting up; or extending the neck. The diagnosis is confirmed by observing a classical response to the Dix-Hallpike maneuver (1). The cause of BPPV is usually idiopathic. It may be seen following head trauma, viral neurolabyrinthitis, postsurgery, vertebrobasilar insufficiency, Meniere's disease, middle and inner ear diseases, and other intracranial diseases(2,3).

Treatments for BPPV have ranged from no intervention to surgical treatment. Some authors use expectant management because the clinical course of BPPV has a spontaneous recovery usually in weeks or months(4,5). However, in some patients, the condition may persist for a year. These patients miss work with prolonged periods of disabling vertigo, resulting in rigid personalities. Antivertiginous medications have found to be ineffective in controlling BPPV (6). Surgical treatments, such as singular neurectomy(7) or posterior canal occlusion(8), are reserved for intractable chronic cases. Hence, here is much current interest directed toward physical therapy.

There are three forms of physical therapy that use a single treatment approach. Brandt and Daroff proposed the first one in 1980(5). The second is a liberatory maneuver, which was proposed by Semont et al in 1988(9). The third therapy was a canalith-repositioning procedure (CRP), which was introduced by Epley in 1992 (10). Based on the "Canalithiasis theory", Epley tried to modify the position of the patient's head for removing the particles from the posterior semicircular canal to the utricle. Due to the very high rate of success, this therapy has been modified and studied worldwide in recent years.

The success rate in curing the rotatory nystagmus of this maneuver ranged from 43 to 90 per cent in various studies(11-17). Improvement of the symptoms occurred in 78.9-100 per cent of their patients. Most of the studies assessed the outcome at one month, and multiple treatments were required in up to one-third of the patients(8). This high rate of improvement may reflect the spontaneous resolution of BPPV. There are, however, many benefits of CRP, such as shortening the time of disability, decreased use of medication, and less time lost from work. This led us to further study the efficacy of this technique that we modified from Epley's maneuver. Our technique was easily done. We did not use a mastoid oscillator or give premedication. After finishing the maneuver, the patients could do daily their activities without restriction, as opposed to the post-treatment instruction of numerous other studies. This preliminary study reports the efficacy of our technique.

SUBJECTS AND METHOD

Subjects

The vertiginous patients who came to the neurotologic clinic at Srinagarind Hospital from January 1997 to December 1998 and were diagnosed as BPPV were included. A criterion for diagnosis of BPPV was positive classical nystagmus as described by Dix-Hallpike(1). The patients who had neck problems, unstable cardiopulmonary status, or resisted the maneuver were excluded.

Method

A complete neurotologic examination was performed to identify the causes. Then the patients received treatment modified from Epley's maneuver. We gave neither pre-medication nor used the mastoid oscillator. Our technique had four positions as illustrated in Fig. 1. The first position was the Dix-Hallpike position with the affected ear dependent. After rotatory nystagmus had gone, the patient's head was turned 90° to the opposite side with the affected ear uppermost. After rotatory nystagmus had ceased, the patient was asked to roll over on the table until the patient was in the prone position with the head turned 90° from the second position (180° from the original position). Then the patient was turned in a complete circle to the sitting position (the fourth position). After a few seconds, the patient was taken into the Dix-Hallpike position again to observe rotatory nystagmus. If it was present, the patient was treated by this maneuver again. The maneuver can be repeated until nystagmus is absent, but not more than five repetitions per session. We gave the patient antivertiginous drugs with instructions to take the drug with a feeling of whirling sensation only. The patient was instructed to follow-up within the period of one week to two months later. An absence of

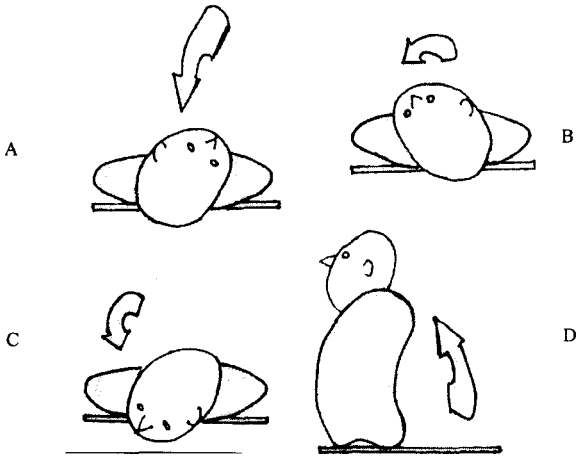

Fig. 1. Our technique of canalith repositioning procedure for the right affected ear.
A. The Dix-Hallpike position.
B. Head of the patient turned to the opposite side (the second position of Epley).
C. The patient rolled to the prone position with the head 180 degrees from the first position.
D. The patient turned in a circle to the sitting position.

nystagmus when performing the Dix-Hallpike maneuver was the criterion for cure.

Statistic analysis

The result was statistically studied by descriptive analysis.

RESULTS

The total number of patients included in this study was 19. There were 12 females and 7 males. The mean age of the patients was 47.7 years, ranging from 19 to 73 years. BPPV was unilateral in 17 patients. The causes of BPPV were post-traumatic in 4 patients, vestibular neuronitis in 3 patients, vertebrobasilar insufficiency in 3 patients, and idiopathic in 9 patients. The duration of positional vertigo ranged from 2 days to 6 years. Six patients had positional vertigo within 2 weeks of their consultation. Ten patients suffered from positional vertigo over a period of 3 months. There was one patient who did not come to follow-up and another one who did not respond to the CRP. All of the remaining patients responded to the CRP. Therefore, the efficacy of this procedure for curing nystagmus and vertigo was 89.5 per cent. The number of sessions required to cure the nystagmus is shown in Table 1 and Fig. 2. The efficacy of CRP for curing BPPV in a single treatment was 70.59 per cent. The duration of symptoms until cessation of nystagmus is shown in Table 2 and Fig. 3. 64.71 per cent of the patients were symptom free within two weeks. 76.47 per cent were symptom free within one month. Only one case in our study was cured after 2 months of treatment with CRP. This one was the first case in our experience. He had bilateral posttraumatic BPPV and was unable to work for 4 months before enrolling in the study. We performed only one cycle of CRP in each session and assessed the outcome in the period of 1-2 months. Although it took time for his nystagmus to be cured from bilateral BPPV, his vertiginous symptom was improved impressively after the first session. Most of the patients did not take an antivertiginous drug after the CRP. They described their symptom after finishing the CRP as a floating sensation and after a few days, the vertigo stopped even in the unresponsive case.

There were five patients in this study who had recurrent attacks of positional vertigo after initial cure from CRP. The duration of recurrence ranged from 2 to 15 months. Four patients had at least two recurrent episodes of positional vertigo. The recurrence occurred on the same side in three patients: one in the horizontal canal; one in the anterior canal and the other in the posterior canal. Two patients, who had bilateral disease, had recurrent attacks in both ears. The result of CRP in recurrent patients was the same as those without recurrence. All of these patients responded to the CRP for the involved canal. Only one patient had a complication from the CRP. He had a vago-vagal reflex, and horizontal canalithiasis occured in a separate session. However, these complications were easily managed. Vago-vagal reflex during the procedure was managed by lying the patient down and stopping the procedure for that session. In the next session, the procedure was performed slowly and the complication did not recur again. The horizontal canalithiasis was immediately managed with CRP for the horizontal canal. The result was as successful as that of the posterior canal.

Table 1. Number of sessions required until BPPV was cured.

Number of sessions	Number of patients	Valid per cent	Cumulative per cent
1	12	70.59	70.59
2	3	17.65	88.24
3	1	5.88	94.12
7	1	5.88	100
Total	17	100	100

Table 2. Time course of recovery.

Time course of recovery (wk)	Number of patients	Valid per cent	Cumulative per cent
1	7	41.18	41.18
2	4	23.53	64.71
4	2	11.76	76.47
8	3	17.65	94.12
32	1	5.88	100

DISCUSSION

Among the modalities of treatment for BPPV, physical therapy has had much recent interest. Antivertiginous drugs alone were statistically less effective in the treatment of BPPV than vestibular training[6]. Norre and Beckers reported the use of vestibular habituation training in the treatment of BPPV[18]. Their study showed that 87.5 per cent of the treatment groups were cured after 2 months of vestibular habituation training. Semont introduced the liberatory maneuver for treatment of BPPV in 1988. This maneuver proved to be effective for a single treatment of BPPV in 53-85 per cent of the patients, and had a 92.7 per cent overall effectiveness in curing BPPV[12,19]. Unfortunately, there are few studies of a randomized trial comparing the efficacy of the liberatory maneuver with the other modalities. Most of the studies were directly interested in the canalith repositioning procedure. Many controlled studies showed that the effectiveness of this procedure was superior to watchful expentancy[16,17,20]. Only the randomized control study of Blakley did not agree with this[15]. Upon review of Blakey's study, the canalith repositioning procedure in his study was not the same as described by Epley, and the outcome was a subjective assessment only. The study of Lynn et al showed that a subjective assessment was much more variable, particularly if a concurrent vestibular problem existed[16]. They suggested using a negative Dix-Hallpike test result as proof of success of the CRP. This observation was the same in our study. Several patients in our study reported improvement even though the nystagmus was positive on Dix-Hallpike test.

When comparing CRP with other physical therapies such as liberatory maneuver or vestibular habituation training, CRP was shown to be equally as effective as the other physical therapies[12,17]. However, CRP was shown to have the advantage of fewer treatments being required[17]. The study of Herdman et al compared the effectiveness of CRP with Semont's maneuver[12]. This study showed no statistically significant difference between treatments. Nevertheless, CRP was not the same as described by Epley. They did not perform the third position of Epley and only one treatment was done in each session. The outcome of treatment was not assessed by a Dix-Hallpike test in every patient. When they treated a series of 30 consecutive patients using the modified procedure as mostly described by

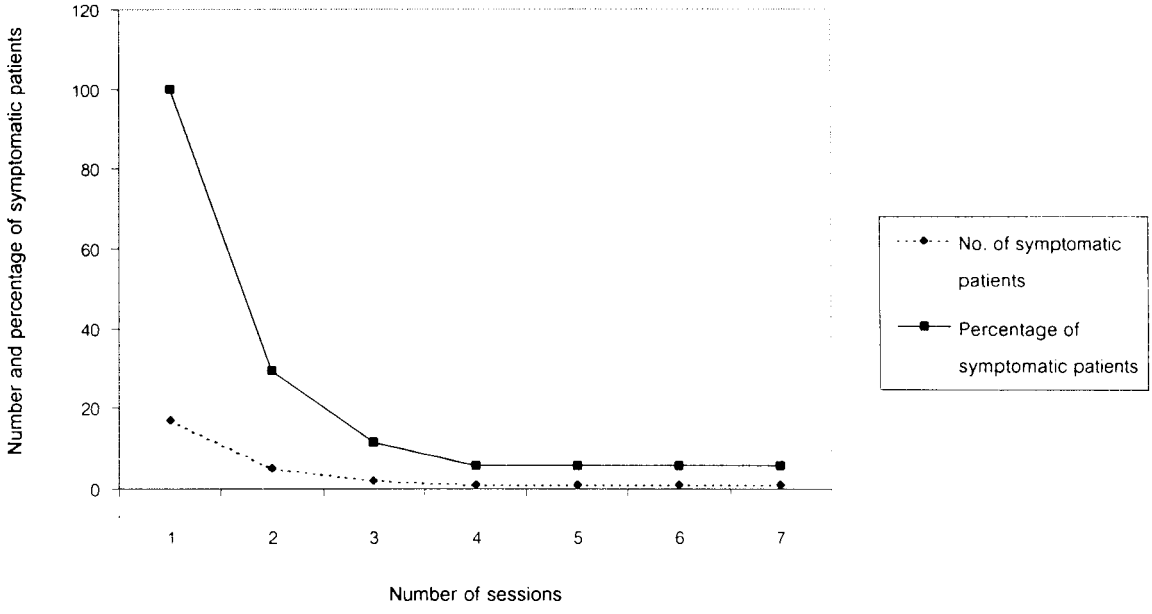

Fig. 2. Number of sessions required until BPPV was cured.

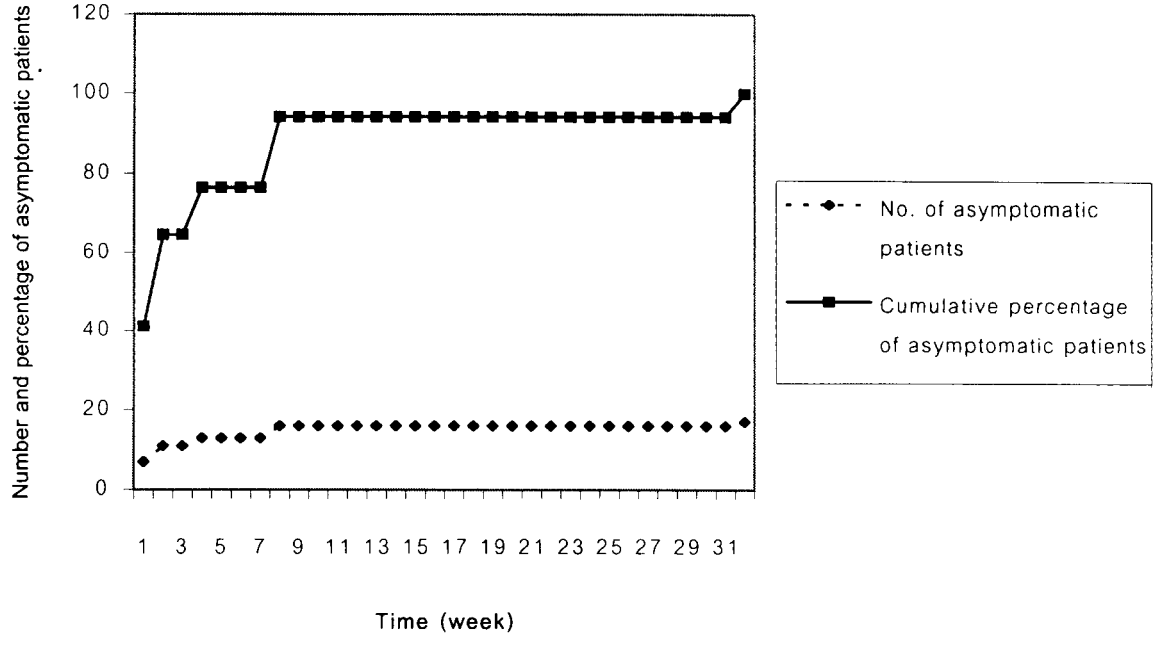

Fig. 3. Time course of recovery.

Epley, the result was improved. The effectiveness of this procedure was increased from 57 per cent to 83 per cent after a single treatment.

Although our study did modify the third position of Epley, we kept the head turned like that of Epley. We can insure that the otolith will move into the common crus when we observe the nystagmus response in this position. Our fourth position was also modified from that of Epley because turning in a circle should move the particle out of the canal easier than turning back. We used neither premedication, a mastoid oscillator, nor post-treatment instructions. Our results did not differ from other studies. Post-treatment instructions such as: keeping head upright at least 48 hours; wearing a neck brace; and avoiding the provoking position until follow up, did not influence the effectiveness of CRP in our study. In addition, these instructions often caused the patient discomfort. Our study did not give post-treatment instructions to the patient because we wanted to assess the effectiveness of CRP as a single treatment. If the CRP had redistributed the particle out of the posterior canal into the utricle, then the patient should be free of symptoms after treatment. A short time of assessment better represents the effectiveness of CRP than a long time, because vestibular adaptation will influence early recovery. The dynamic deficits take weeks to partially recover[21]. The effectiveness of CRP as a single treatment in our study was 70.59 per cent. If repeated, the success rate increased to 89.5 per cent. 64.7 per cent of our patients were symptom free within two weeks. This implies that the mechanism of CRP in curing BPPV would be the redistribution of the particle rather than vestibular adaptation.

The other observation in our study was that the pathophysiologic mechanism of BPPV might not be the same in every patient. One patient, who did not respond to CRP, continued to have a classical response to the Dix-Hallpike maneuver after each cycle of CRP. This patient was treated with a maximum of 5 cycles per session every week. One month later, her treatment was switched to the liberatory maneuver, which decreased her nystagmus to 2 cycles per session. This patient had a negative Dix-Hallpike test after one month of the liberatory maneuver.

The recurrence of BPPV in our study was 26.3 per cent, whereas, the other studies reported a recurrence rate of 9-30 per cent[10-13]. Timing of recurrence occurred after 2-15 months of successful treatment with CRP. However, CRP was also effective in the treatment of patients both with or without a recurrence. Complications of CRP occurred in 5.3 per cent of the patients in our study. This was comparable to those of Herdman[22]. Although they were easily managed, they were seldomly mentioned in other studies.

SUMMARY

Canalith repositioning procedure is effective in the treatment of BPPV. It has many advantages such as: curing the BPPV in a single treatment approach; shortening the duration of vertigo; decreasing the medication; avoiding an unnecessary operation; and performing it without any extraordinary equipment. However, this procedure should be further studied to learn the cost-effectiveness, complications, and length of time required for recovery, when compared with other modalities.

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การรักษาผู้ป่วย BPPV ด้วยวิธี Canalith Repositioning Procedure ที่โรงพยาบาลศรีนครินทร์

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ที่มา : Benign paroxysmal positional vertigo (BPPV) เป็นสาเหตุหนึ่งที่พบได้บ่อยในผู้ป่วยที่มาด้วยอาการเวียนศีรษะ การวินิจฉัยโรคทำเมื่อตรวจพบลักษณะอาการกระตุกของลูกตา (nystagmus) มีลักษณะดังที่ Dix&Hallpike ได้รายงาน พยาธิกำเนิดของโรคเชื่อว่าเกิดจากตะกอนหินปูนใน posterior semicircular canal การรักษาโรคนี้ส่วนใหญ่เป็นการรักษาแบบประคับประคองเนื่องจากอาการของผู้ป่วยโรค BPPV สามารถหายได้เอง แต่อาจต้องใช้ระยะเวลาเป็นสัปดาห์หรือเดือน การรักษาแบบใหม่ ด้วยวิธี canalith repositioning procedure ที่แนะนำโดย Epley ในปี 1992 เป็นการรักษาที่ได้ผลดีและสามารถลดระยะเวลาและอาการของโรคได้ การรักษาด้วยวิธีนี้เป็นที่สนใจทั่วโลกและมีรายงานผลการรักษาจากหลายสถาบัน

วัตถุประสงค์ของการวิจัย : เพื่อศึกษาประสิทธิภาพการรักษาผู้ป่วย BPPV ด้วยวิธี canalith repositioning procedure โดยประยุกต์จากแบบของ Epley

วิธีการวิจัย : เป็นการวิจัยเชิงพรรณนา ในผู้ป่วยที่มีอาการของโรค BPPV ที่ รพ.ศรีนครินทร์ ตั้งแต่ปี 2539–2541 ซึ่งได้รับการรักษาด้วยวิธีการที่ดัดแปลงจากแบบของ Epley คือไม่ใช้เครื่องสั่นสะเทือนกระดูกมาสตอยด์ (mastoid oscillator) ร่วมกับการดัดแปลงการจัดท่าทางของศีรษะและลำตัว และไม่ต้องมีการปฏิบัติตัวเป็นพิเศษหลังการรักษา

ผลการวิจัย : จากการศึกษาในผู้ป่วย 19 ราย พบว่าการรักษาได้ผลดีในผู้ป่วย 17 ราย (89.5%) มี 1 รายที่ต้องเปลี่ยนการรักษาเป็นวิธีอื่น และผู้ป่วยไม่มาติดตามการรักษา 1 ราย ผลแทรกซ้อนของการรักษาได้แก่ vago–vagal reflex และ lateral canalithiasis พบในผู้ป่วย 1 ราย (5.3%) มีผู้ป่วย 5 ราย (26.3%) ที่มีอาการของโรค BPPV เกิดซ้ำ การรักษาด้วยวิธีการ canalith repositioning procedure ในผู้ป่วยที่มีอาการของโรคซ้ำได้ผลดีพอๆกับผู้ป่วยที่ไม่มีอาการของโรคซ้ำ

สรุป : การรักษาผู้ป่วย BPPV ด้วยวิธี canalith repositioning procedure ที่ประยุกต์จากแบบของ Epley ได้ผลดีเป็นที่น่าพอใจ

คำสำคัญ : Benign Paroxysmal Positional Vertigo, Treatment, Canalith Repositioning Procedure

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