Original Article

Efficacy of the Canalith Repositioning Procedure in Benign Paroxysmal

Karim AMMR[1], Hassanuzzaman M[2], Chowdhury MAY[3], Tayeb MA[4]

Abstract

Benign paroxysmal positional vertigo (BPPV) is paroxysms of vertigo occurring with certain head movements, typically looking up or turning over in bed comprising about 20% of Dizziness cases. This study was carried out to evaluate the Efficacy of canalith repositioning procedure(CRP) in BPPV. A randomized clinical trial including 80 patients with BPPV was performed Medicine & Neurology Outpatient Department, Chittagong Medical College Hospital. The patients were randomly divided into two groups. Group A treated by anti-vertigo drug and CRP, Group B treated by anti-vertigo drug alone. All patients were followed up in hospital at one week after & 4 weeks. The rates of effectiveness of CRP treatment and the control treatment for were 86.8% and 59.4%, respectively. There was a significant difference (27.4%) in the outcomes of the CRP & control groups (P <.05). Mean total drug use for the group A was 10 ± 1, whereas it was 30 ± 1.5 for group B, mean difference = 20 (P < .001, highly Significant). At 4 Weeks, subjective improvement and symptom free occurred in 94.7% patients in group A and 73% patients in group B (difference21.7%). Complications in the CRP group were observed in 10.6% of the patients.

This study demonstrated that canalith repositioning procedure (CRP) was effective in the treatment for benign paroxysmal positional vertigo insofar as it provided faster recovery & low drug dependence. Complications of CRP were limited to 10.6% of patients.

1. Corresponding Author:
Dr. Abul Mansur Md. Rezaul Karim, FCPS, MD
Assistant Professor, Department of Medicine
Cox's Bazar Medical College
e-mail: mansurreza1975@yahoo.com

2. Dr. Md. Hasanuzzaman, FCPS, MD
Associate Prof. and Head, Department Of Neurology
Chittagong Medical College

3. Dr. Mohammed Abu Yusuf Chowdhury, MD
Assistant Professor, Department of Medicine
Chittagong Medical College

4. Dr. Md. Abu Tayeb, MD, FCPS
Asst. Professor, Department of Neurology
Cox's Bazar Medical College

Keywords: Canalith repositioning procedure (CRP), Benign paroxysmal positional vertigo (BPPV).

Introduction

Vertigo refers to a hallucination of movement. Patients experience a sense of environmental spin or self-rotation. Benign paroxysmal positional vertigo (BPPV) is paroxysms of vertigo occurring with certain head movements, typically looking up or turning over in bed. This is due to the presence of otolithic debris from the saccule or utricle affecting the free flow of endolymph in the semicircular canals (cupulolithiasis). BPPV is a common cause of dizziness. About 20% of all dizziness is due to BPPV. While BPPV can occur in children,[1,2] the older individuals are more likely to develop dizziness due to BPPV. About 50% of all dizziness in older people is due to BPPV. In one study, 9% of a group of urban dwelling elders were found to have undiagnosed BPPV.[3] About 03 vertigo cases attend in the MOPD every day. Beside this, a very good number of BPPV cases attend every week in neurology outpatient department of Chittagong Medical College Hospital, Chittagong. The vertigo and accompanying nystagmus have a distinct pattern of latency, fatigability, and habituation that differs from the less common central positional vertigo due to lesions in and around the fourth ventricle. Moreover, the pattern of nystagmus in posterior canal BPPV is distinctive. When supine, with the head turned to the side of the offending ear (bad ear down), the lower eye displays a large-amplitude torsional nystagmus, and the upper eye has a lesser degree of torsion combined with upbeating nystagmus. If the eyes are directed to the upper ear, the vertical nystagmus in the upper eye increases in amplitude. Mild dys-equilibrium when upright may also be present.[4,5] BPPV has often been described as "self-limiting" because symptoms often subside or disappear within 2 months of onset[5-8]. Imai T and others studied Natural course of the remission of vertigo in patients with benign paroxysmal positional vertigo published in journal Neurology[7,9]. The canalith repositioning procedure (CRP) for benign positional vertigo has been shown to be efficacious in various studies.[9-16] The CRP, introduced by Epley and modified in various ways, is the most popular maneuver, though other maneuver like Semont maneuver may be used[17-21]. Canalith repositioning manoeuvre in benign paroxysmal positional vertigo is usually safe[21].

Short and long-term outcomes of canalith repositioning procedure for benign paroxysmal positional vertigo has been shown in various study.[22-24] The present study evaluate the Efficacy of canalith repositioning procedure in benign paroxysmal positional vertigo.

Materials and Methods

Type of study: Randomized case control study.

Place of study: This study was carried out in the out patient department of Medicine and Neurology, Indoor department of Neurology Chittagong Medical College Hospital.

Period of study: This study was conducted from 1st December 2011 to 31th September 2012 for duration of 10 months.

Study population:

The patients who presented with vertigo in the Medicine and Neurology OPD & Neurology ward of CMCH was enrolled in this study.

Study tools: Data collection sheet/Case record form

Sample size: 40 patients in each group, A total number of 80 patients presented with BPPV were enrolled in this study. To yield an 80% power of detecting a clinically important difference in success rate of 30% between the control & treatment group at a significance level of 5%, the required sample size is 40 patients in each group. We assumed a success rate of 50% in control group. A total number of 80 patients presented with BPPV were enrolled in this study.

Sampling technique: Random sampling.

Selection of Subjects:

Inclusion Criteria:

1. Cases of posterior canal-BPPV on the basis of symptoms & Dix-Hallpike maneuver.

2. Vertigo presented within one month.

3. No canalith repositioning treatment applied before.

Exclusion Criteria:

1. Patient having any suspicion of vertigo other than BPPV which needed imaging.

2. Patients who have severe cervical spondylosis

3. Patients who have unstable cardiopulmonary status

4. Patient receiving multiple anti-vertiginious medication

5. Patients unwilling to include in the study.

Results

During the study period, a total of 100 fresh BPPV cases were screened. Of them 80 patients met the diagnostic criteria of BPPV. Out of them 78 patients met the inclusion and exclusion criteria to be selected as study subjects. The study subjects were randomly selected fortreatment with either anti-vertigo drug + CRP (group A) or anti-vertigo drug alone (group B). During the follow up period 01 patient from group A and 02 patients from group B were excluded from the study due to failure to attend at the follow-up. Patients who missed follow up after 1week of starting treatment but attended third follow-up after completion of 4 weeks of treatment were included as having completed the study. As such, ultimately, 38 patients in group A & 37 patients in group B completed the study.

In group A 50% cases were idiopathic, 31.6% post-traumatic, 13.1% associated with migraine & 5.3% others. In group B 51.4% cases were idiopathic, 29.7% post-traumatic, 10.8% associated with migraine & 8.1% others. P >0.05, not significant with X^2 test.(table I)

Table- I: Etiology among the study groups (with X^2 test significance)

Etiology	Group A		Group B (Control)		*P* Value
	n	%	n	%	
Idiopathic	19	50	19	51.4	>.05
Post-traumatic	12	31.6	11	29.7	>.05
Migraine	05	13.1	04	10.8	>.05
Others	02	5.3	03	8.1	>.05
Total	38	100	37	100	

In group A 50% cases were right sided, 36.8% cases were left sided, 13.1% cases were bilateral. In group B 48.6% cases were right sided, 40.5% cases were left sided, 10.8% cases were bilateral. P value >0.05, not significant with X^2 test.(table II)

Table- II: Distribution of the side of canal involvement among the study groups

Side Involved	Group A		Group B (Control)		P value
	n	%	n	%	
Right	19	50	18	48.6	>.05
Left	14	36.8	15	40.5	>.05
Bilateral	05	13.2	04	10.8	>.05
Total	38	100	37	100	

Mean total drug use for the group A was 10 ± 1, whereas it was 30 ± 1.5 for group B (mean difference = 20

(P < .001, highly Significant with t - test). (table III)

Table - III: Antivertigo medications among the study groups (with t - test significance)

Vertigo Medication		N	MEAN	± SD	MEDIAN	RANGE	P
In 2nd Visit	Group A	37	7	1.5	8	3 – 10	<0.05
	Group B	37	13	1.35	12	5 – 15	
	TOTAL	74	10	1.42	10	4 – 12.5	
In 3rd Visit	Group A	38	10	1	10	3 – 13	<0.01
	Group B	37	30	1.5	28	20 – 45	
	TOTAL	75	20	1.25	17	11.5 – 29	

Dix Hallpike's maneuver became -ve in 75.7% patients in group A & 32.4% patients in group B At 1 Week. At 4 Weeks, Dix Hallpike's maneuver became -ve in 86.8% in group A and 59.4% patients in group B, P < .001, highly Significant with X^2 test.(table IV)

Table- IV: Dix Hallpike's maneuver after 1 week & 4 weeks (with X^2 test significance)

Dix Hallpike's maneuver	At 1 Week				At 4 Weeks				*P* Value
	Group A		Group B		Group A		Group B		
	n	%	n	%	n	%	n	%	
+ve	09	24.3	25	67.6	05	13.2	15	40.6	<.001, Significant
-ve	28	75.7	12	32.4	33	86.8	22	59.4	<.001, Significant
Total	37	100	37	100	38	100	37	100	

Subjective Improvement + symptom free occurred in 86.5% patients in group A & 64.9% patients in group B At 1 Week. At 4 Weeks, Improvement + symptom free occurred in 94.7% patients in group A and 81% patients in group B, P < .005, Significant with t - test.(table V)

Table - V: Subjective assessment in different visits among the study groups

Symptom Grading	At 1 Week				At 4 Weeks				*P* Value
	Group A		Group B		Group A		Group B		
	n	%	n	%	n	%	n	%	
Stable/worse	05	13.5	15	40.5	02	5.3	10	27	<.005 Significant
Improved	17	86.5	16	59.5	12	94.7	16	73	<.005
No symptom	15		06		24		11		Significant
Total	37	100	37	100	38	100	37	100	

Discussion

BPPV is an important cause of recurrent vertigo and vertigo related disabilities in general population. Its effective and curative treatment is not available to date.[19] So far no drug has shown any remarkable outcome. Symptomatic medication is used to reduce frequency, duration and severity of attacks. Until recently, BPPV was believed to be a self-limiting condition, and hence it required no treatment.[11,18] The addition of various types of head maneuvers particularly Epley's maneuver for the treatment of BPPV has been very successful.[13,19] The most common presenting complaints other than vertigo among study subjects include nausea/vomiting (78.9% in group A & 75.7% in group B), next complaints are Dizziness/light headedness, Imbalance & Headache. In the study, group A has 28.9% and group B has 27% positive family history of BPPV. No significant difference observed between 2 groups in chi-square test (P>0.05). In group A 50% cases were idiopathic, 31.6% cases were post-traumatic, 13.1% cases were associated with migraine, & 02 cases were post- stroke. In group B 51.4% cases were idiopathic, 29.7% cases were post-traumatic, 10.8% cases associated with migraine, 01 cases were post-stroke & 02 cases were associated with dementia. The aetiological difference between two groups was not significant (p>0.05). *Simhadri Sridhar*, et al,& *Kwanchanok Yimtae*, et al, showed 50% & 67.2% cases are idiopathic respectively.[14,19] Regarding the side of Involvement, In group A 50% cases were right sided, 36.8% cases were left sided, 13.1% cases were bilateral. In group B 48.6% cases were right sided, 40.5% cases were left sided, 10.8% cases were bilateral. The difference of side Involvement between two groups was not significant (p>0.05). Totally 37 cases were right sided, 29 cases were left sided, 9 cases were bilateral. The effectiveness of our CRP technique in curing vertigo was 75.9%. This result nearly matched to various previous reports.[7,13-20] The effectiveness of the control treatment for BPPV in our study was 48.2%. The time course of recovery for patients receiving CRP treatment, as assessed by the Dix-Hallpike test, was significantly faster than for the patients in the control group. In this study, the rates of effectiveness (Dix Hallpike's maneuver became -ve) of CRP treatment and the control treatment for benign paroxysmal positional vertigo were 75.7% & 32.4% respectively at the end of 1 week. But it became 86.8% and 59.4%, respectively after 4 weeks. This corresponded to previous reports at the 1-month assessment (ie, 76.5%)[18]. There was a significant difference in the treatment outcomes of the CRP and control groups (P <.05). Though significant, difference became lesser at 4 weeks. The time course of recovery for patients receiving CRP treatment, as assessed by the Dix-Hallpike test, was significantly faster than for the patients in the control group. Moreover, use of medication among patients in group A was significantly reduced compared with patients in the group B. Mean total drug use for the group A was 10 ± 1, whereas it was 30 ± 1.5 for group B (mean difference = 20 (P < .001, highly Significant).

In this study, Subjective Improvement + symptom free occurred in 86.8% patients in group A & 59.5 % patients in group B at 1 Week (difference 27.3%). At 4 Weeks, Improvement + symptom free occurred in 94.7% patients in group A and 73% patients in group B (difference21.7%). P Value <.005 Significant. Our results showed that the CRP is beneficial for patients with BPPV, providing faster recovery, and requiring less anti-

vertiginous medication. Complications from CRP occurred in four patients (10.6%). Two patients (5.3%) develop fainting after undergoing repeated maneuvers in one session, but the reaction resolved after the maneuvers were stopped. Two other patients (5.3%) had immediate symptoms of lateral BPPV on the same side but responded immediately to prompt CRP of the lateral canalithiasis (360° rotation technique). Complications of CRP were found in 13.8% of patients in the study done by Yimtae et al.[19] This study has shown the efficacy of canalith repositioning procedure(CRP) in BPPV treatment. There are very few study showing efficacy of the CRP in Bangladesh. So, we recommend as follows:

CRP should be used in BPPV treatment.

CRP should be an alternative treatment in cases where drugs could not be prescribed.

Future studies should be done to see efficacy of CRP for long duration (3 months or more), taking large sample size. Studies should also be done to see whether efficacy remain sustained.

A cross-over study may be done in future between anti-vertigo drug + CRP or anti-vertigo drug alone.

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