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The Efficacy of Epley Maneuvers in the Management of Subjective Benign Paroxysmal Positional Vertigo in Sulaimany Governorate

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Abstract

Background and objectives: Benign paroxysmal positional vertigo is vestibular disorder with most frequent episodes. It is mostly idiopathic. Epley maneuver gives good results in most patients. The aim of this study is to confirm the diagnoses of benign paroxysmal positional vertigo by Dix-Hall pike test. And to evaluate the effectiveness of Epley maneuver in treating patients with this disorder.

Methods: A prospective study conducted on (100) patients with benign paroxysmal positional vertigo, in Sulaimany training Center for Otolaryngology-Head and Neck surgery, Kurdistan audiological centre from September 2018 to November 2019. Those with induced vertigo without nystagmus were included in the study. All patients had undergone complete ear nose and throat and audiological assessment, diagnoses were confirmed by Dix Hallpike test. The maneuver was performed weekly over 4 weeks and the results were recorded accordingly.

Results: Twenty eight patients were males (28%), seventy two patients were females (72%). Age ranged between 18 and 72 years. Mean age (42.23). There was complete recovery in (82%), partial recovery in (13%), and resistance in (5%) these values were significant statistically.
Conclusions: Epley maneuver gave good results in management of benign paroxysmal positional vertigo and is a safe procedure without complications. Dix hallpike test gave a definite diagnosis of benign paroxysmal positional vertigo particularly the posterior canal.

Keywords: Benign paroxysmal positional vertigo, Dix-Hallpike test, Epley maneuver.

Introduction

Benign paroxysmal positional vertigo (BPPV) is the commonest cause of vertigo with prevalence of 2.4%[1]. It is characterized by brief spells (lasting seconds) of severe vertigo after specific head movement of which rolling over in bed and extension of the head is the most common[2].The causes are mostly idiopathic (58%), head trauma (6%–18%), inner-ear disease (3%–9%)[3]. The trauma force may cause otoconial release into endolymph. It was first described by Barany in 1921, Dix and Hall pike in 1952[4]. The pathophysiology of BPPV either: canalolithiasis or cupulolithiasis. Cupulolithiasis described cupula attached particles. Canalolithiasis is free-floating particles within semicircular canal (SCC), and the majorities are posterior cacanalolithiasis[5]. Patients with BPPV present with rotational vertigo, lightheadedness, unsteadiness, blurred vision, nausea and vomiting, without hearing loss or tinnitus. The Dix-Hall pike (D-H) test is used in both the diagnosis, short- and long-term follow up. It is done with the patient in sitting position on a flat table; the examiner turns the patient's head 45°one side, then rapidly, but smoothly lays the patient into a supine position, with the head hanging about 20° over the table end, observes patient's eyes for 30 seconds. The maneuver is repeated with the head turned to the opposite side. The result is positive if

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the patient develops vertigo and nystagmus. It has a +ve predictive value of 83% and -ve predictive value of 52 %[6]. Patients with vertigo but without visible nystagmus on positional testing, i.e. subjective BPPV have been assessed by many studies, the treatment was chosen on symptoms reported on positional testing[7].Objective BPPV defined as vertigo with nystagmus in D-Hteast[8]. Epley developed (canal repositioning procedure CRP) in 1992 in order to move the particles from the posterior canal into the utricle via the common crus. Patients should be counseled about the procedure and the possibility of vertigo prior to commencement. Epley advocated repeating the maneuver until there is no nystagmus or no progress made in the last two cycles. Total resolution of vertigo reported in 90%, but with persistence of other symptoms in 10% of patients. The affected posterior semi-circular canal (p-SCC) is identified by the D–H test. The sitting patient on the couch facing away from the examiner and brought down with the head turned (45) degrees to the affected side and extended over the edge of the table, the head is then moved 90 degrees to the opposite side, rotating the body 90 degrees so the patient is lying on the side, while the head is maintained firmly in place, looking obliquely downwards. The maneuver finishes with the patient in the sitting position with head turned forward 20 degrees[9]. As shown in Figure (1).

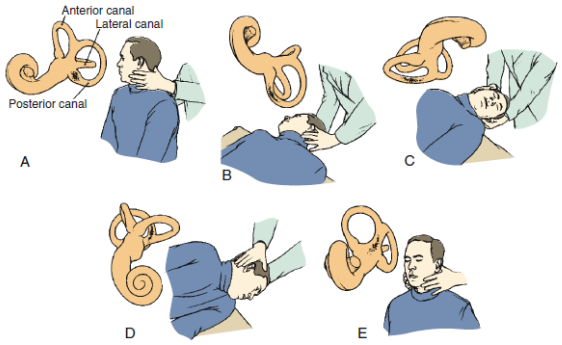

Figure (1) Epley maneuver for treatment of BPPV[10].

The aim of this study is to confirm the diagnoses of BPP by D-H test. And to evaluate the effectiveness of Epley maneuver (CRP) in treating patients with BPPV.

Patients and methods

A prospective study done from Septembers 2018- to November 2019 In Sulaimany teaching center conducted on (100) BPPV patients managed with Epley maneuver. Diagnosed patients as posterior canal (pc) BPPV based on clinical and vestibulo audiological features and positive D-H test were treated with Epley maneuver. Informed consent was taken from the patients after the approval of the ethics and the scientific committee of Kurdistan board for medical specialist. Designed questionnaire stressing various applicable issues to vertigo, including nature, duration, related symptoms and associated chronic medical illnesses was used. Inclusion criterion was suspected BPPV patients presenting with vertigo or nystagmus in the D-H test. Vertiginous patients without nystagmus also included i.e. negative D-H test. Exclusion criteria: Patients with restricted neck movements, cervical spine fracture, surgery, heart disease, CNS disease, chronic suppurative otitis media (COSM) and patient refusal. Patients having complaints of positional vertigo were evaluated with D-H test on both side to detect the presence of

nystagmus or vertigo. Results were divided into negative and positive. The positive was divided into vertigo with nystagmus and vertigo without nystagmus. The Epley maneuver was done on patients with head rotated 45˚ in the direction of the involved ear , moved from the sitting to supine position with head extended 30 degree downward ,then fixed in this position with open eyes. Occurrence of mixed torsional and vertical nystagmus with the upper eye pole beating toward the under most ear was noticed lasting within 60 second, fatigable on repeating the test and associated with vertigo which comes after the nystagmus. Negative nystagmus patients but having rotational vertigo on D-H test negatively termed subjective BPPV. The severity of vertiginous attacks were determined according to patient's feeling of vertigo and associated autonomic symptoms (palpitation, sweating, hypotension, nausea and vomiting) based on 10 point likert scale: 0= no symptoms of vertigo; 10 most sever and unbearable symptoms[11]. With patients in sitting position the head tilted to the affected side at a 45˚ angle, changed to supine position with the head beneath the bed at an angle of 30˚, while maintaining the positioning of the body, the head being rotated to the healthy side at a 90˚ angle, then both the body and head rotated to the healthy side at 90˚ i.e. (the head is looking obliquely downward at 135 degree) kept in this position for 1 minute then returning the head and the body to sitting with 20 degree forward tilted head**.** Post maneuver; the patient was advised to lie in semi reclining position while sleeping for 48 hours, avoiding provoking head positioning and sleeping on affected side for at least 1week, no medications were prescribed. Patients were scheduled for follow-up over 4 weeks after the maneuver. In each visit, the patient was tested with D-H maneuver which in case positive then another Epley maneuver was applied, if it was negative, the maneuver was ended. Recovered patients were appointed for follow up for 12 month if symptoms recur, followed up in group of nearly 15 to 20 patients weekly for 5-6 weeks. Whereby the collected data were reviewed and analyzed using the statistical package for the social sciences (SPSS) version 23. P-value was obtained for a categorical variable using chi-square and a p-value of (≤ 0.05) was statistically significant.

Results

Out of 100 patients; 28 patients were males (28%), 72 patients were females (72%). Vertigo lasted 10-110 seconds. With mean of (33) seconds. The following results of the severity of vertigo were obtained as shown in the figure below:

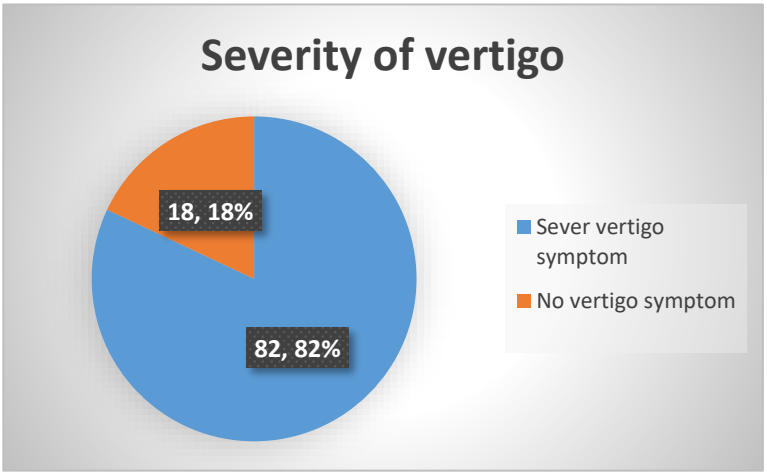

Figure (2): Analysis of severity of vertigo by percentage

Sever vertigo with score of 10 found in 82 patients (82, 82%), while no vertigo with score of 0 found in 18 patients (18,18%)As shown in the figure above. Vertigo nature (spinning or non- spinning), attack frequency (multiple or single attacks/day), frequency of previous and first attacks, the following results were obtained as shown in figure (3) below

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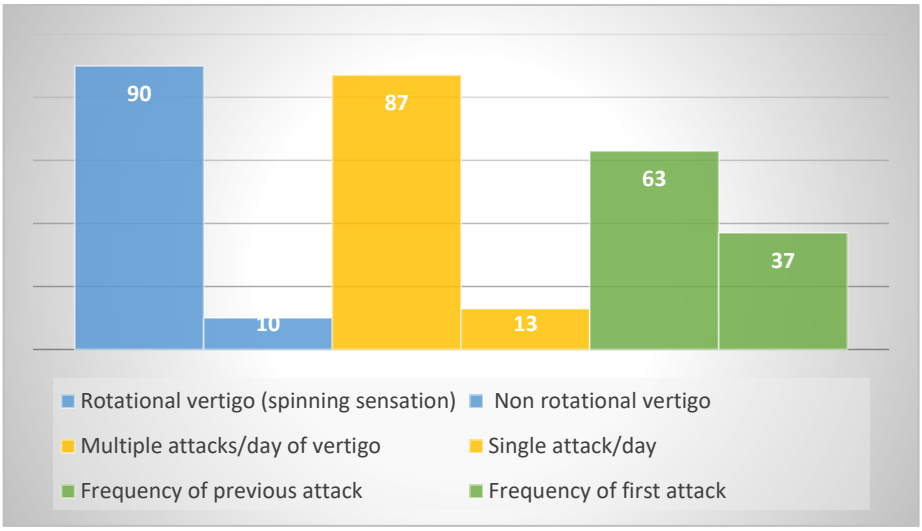

Figure (3): Analysis of different characteristic of BPPV

Rotational vertigo (spinning sensation) was found in 90 patients (90%), while non-rotational vertigo (lightheadedness, earthquake feeling, or strongly vigorously shaking as stormy journey & as if pushed from backward) was found in 10 patients (10%).Multiple attacks/day found in 87 patients (87%), single attacks /day was found in 13 patients (13%).The frequency of previous attack was found in 63 patients(63%), frequency of first attack found in 37 patients (37%). The following results were obtained regarding the recovery state after Epley maneuver.Table (1).

Table (1): Frequency distribution of recovery state

Recovery state	**No.**	**%**	p- value
Complete recovery	82	82.0	
Partial recovery	13	13.0	0.039
Resistance (no recovery)	5	5.0	
Total	100	100.0	

Complete recovery was obtained in (82%), partial recovery in (13%). While (5%) of patients did not recover. The following results were obtained for the time recovery state. Table (2)

Table (2): Frequency distribution of time table of recovery state

Week	**No.**	**%**
First week		
Complete recovery	35	35.0
partial recovery	60	60.0
Resistance (no recovery)	5	5.0
Total	100	100.0
Second week		

Complete recovery	29	29.0
partial recovery	65	65.0
Resistance (no recovery)	6	6.0
Total	100	100.0
Third week		
Complete recovery	44	44.0
partial recovery	49	49.0
Resistance (no recovery)	7	7.0
Total	100	100.0
Fourth week		
Complete recovery	33	33.0
partial recovery	54	54.0
Resistance (no recovery)	13	13.0
Total	100	100.0

The best results of Epley maneuver obtained in the 3rd week was 44%, and the least was 29% in the 2nd week.
The following results were obtained for Dix hall pike test. Table (3).

Table (3): D-H test with and without nystagmus.

	No.	**%**
Dix-Hall pike(+ve nystagmus) (Definite BPPV)	60	60.0
Dix-Hall pike(-ve nystagmus) (Subjective BPPV)	40	40.0
Total	100	100.0

Definite BPPV found in 60 patients (60%). Subjective BPPV found in 40 patients (40%).
The following results were obtained for the recovery status after D- H test. Table (4).

Table (4): Recovery status after Epley maneuver in subjective and definite BPPV.

Dix-Hall pike test	**Recovery state**			**Total**	**p-value**
	Complete recovery	**Partial recovery**	**Resistance (norecovery)**		
Definite BPPV(+ve nystagmus)	53(88.3)	7(11.7)	0(0.0)	60(100.0)	0.01
Subjective BPPV(-ve nystagmus)	29(72.5)	6(15.0)	5(12.5)	40(100.0)	
Total	82(82.0)	13(13.0)	5(5.0)	100(100.0)	

Complete recovery obtained in all patients with definite BPPV whether partial or complete, whereas in subjective BPPV; only 5 patients (12.5%) were resistant.

Discussion

Benign paroxysmal positional vertigo accounts for 20% of all vertigo complaint, posterior canal being the most common BPPV (relative frequency=90%). Seen mostly at ages of 50 - 70 years. Accounted for by age- degenerative changes causing otoconial debris, which floats freely finding their way into semi circular canal (SCC) [12].

The Epley maneuver has been accepted after evidence-based reviews by the American Academy of Otolaryngology – Head and Neck Surgery Foundation[13]. A recent Cochrane meta-analysis has found that the Epley maneuver is effective in 80% of cases[14]. The study aims to demonstrate the effectiveness of CRP in the treatment of pc BPPV. In current study there is no definite and precise expression of vertigo felling and definite nystagmus detection with any clear cut demarcation of both statuses by researchers and most audio vestibular physicians. Patient's average age was 42.23±11.90 years, which nearly co-inside with the result obtained by study Yaser et al[12] where average age was 56.4 ±11.3 years. Females are approximately 2–2.5 times more likely to experience BPPV than males in the study; co- insides with Yaser et al[12] who found Females are 1.6–2 times more than males. This is in contrary to the studies by Hesham et al[15] in which BPPV is more common in male population in Bahrain (62.5%).This may be due to under estimation record, less population and more religiously restricted presenting females with low socioeconomic state. Vertigo duration was 33.92; seconds. Showed longer vertigo and nystagmus duration in minority of patients explained by the fact that some patients miss understanding vertigo subjectively or trying to exaggerate the symptom. This is higher than BPPV duration which is usually (10-20) seconds[16]. In current study; the diagnosis of BPPV is made by history, clinical findings, and positive D-H test, there were no auditory complaints except for 2 patients (2%) who had tinnitus and hearing loss as presbyacusis with regard to their age. Those with negative D-H test (subjective BPPV) were included, co-insiding with study done by Lorens[17]. In current study definite BPPV found in 60 patients (60%) while subjective BPPV found in 40 patients (40%), supported by Cranfield study[18] whose patients experience vertigo without nystagmus with D-H test explained by: subtle nystagmus missed by the observer, fatigable nystagmus with repetition. In current study the missed nystagmus may be due to spontaneous recovery, and lack of Frenzel glasses. In current study those with definite BPPV: complete recovery was found in 53 patients (88.3%), partial recovery found in 7(11.7%), resistance was 0. While subjective BPPV with complete recovery found in 29 patients (72.5%), partial recovery found in 6 patient (15%), and resistance was in 5 patient (5%).In Massouds study[19], 43 patients were negative D-H test, the percentage of cured patients was (93%). In study by Soto Varela et al[20]. the number of patients with negative D- H test was 30. Percentage cure was (71%).A results matching with the studies mentioned above. In current study Epley maneuver was applied to all patients and the result classified into three types: type 1(complete recovery): Patients totally free from nystagmus and vertigo. Type II (incomplete (partial) recovery): Resolution of vertigo but residual imbalance or lightheadedness or both. Type III (no recovery) or resistance[21]. Complete recovery was obtained in 82 patients (82%), incomplete recovery was obtained in 13 patients (13%), and 5 patients (5%) were not cured. Table (1).In Epley et al study[9]; the success rate was (80%) in 30 patients. Nasir et al[22] reported (85%) success rate in35 patients co-insiding with the current study results. Type I response was observed in 82% patients in current study. This is nearly similar to Epley[9], Nunez[23], and Verma[24] who reported type I response in nearly 90% of their cases. In current study; type II response was observed in another 13% cases, which is comparable to Epley[9], Verma[24] and Jose et al[25]who reported improved response (type II) in nearly 10% of their cases. In current study; (type III) response was observed in 5 patients (5%).This is slightly more than that revealed by Nunez[23]who also reported no

change in 0.8% of cases this may be due to more tested sample and less definite diagnosis of BPPV. At 1 week follow-up; 35% of our patients were totally relieved of their symptoms. This is less than a study by Froehling[26] who had reported relief in higher percentage (50%) of their cases. However; our results were lower than other studies[27-29] that reported relief in 88.6, 72, and 60.6% cases respectively. Waleem found the success rate of Epley manuever after 1 week follow-up was 63.6%, which increased to 72.7% after 2 weeks[30] .This difference of results after 1 week follow-up may be due to more tested sample and less precise diagnosis of BPPV in the above studies[26-30]. In current study; 29% of patients were totally relieved after 2 weeks, which is much lower than Asawavichianinda et al[27] and Dal[28] who had reported complete relief in nearly 88% of their patients. This result may be related to environmental factors in which Thailand is an equatorial place affecting the function of vestibule of the ear. Although virtually all patients can be treated successfully with the Epley maneuver, almost one-fourths to half of patients can be expected to experience a further recurrence of symptoms[31]. Recurrence rates ranging between 9.75 and 45% have been reported in literatures. In current study 28 cases of recurrence was observed in a follow up of 1 year. In series by Nunez[23] a 26.8% recurrence rate was reported with an average follow-up of 15.9 months. The results of the current study result of recurrence con-side with the result obtained by Nunez.

Conclusion

Epley maneuver is effective in the management of BPPV, safe (because we did it on 100 patients without complications and most of the patients got benefit from it, and easy procedure to be performed; it can be regarded and considered as the 1st line of treatment for BPPV. The D-H test can give a definite diagnosis of BPPV particularly posterior canal.

Conflicts of interest

There were no conflicts of interest.

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