

## MANAGING BENIGN PAROXYSMAL POSITIONAL VERTIGO WITH EPLEY'S PARTICLE REPOSITIONING MANEUVER

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علاج الدوار الوضعي الحميد بواسطة طريقة ايبلي

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يعتبر الدوار الوضعي الحميد أكثر مرض طرفي مسبب للدوار. و يتميز هذا المرض بحدوث نوبات متكررة من الدوار تستمر لفترة أقل من دقيقة مصحوبه برأرة في العينين عندما تكون رأس المريض في وضع معين. و يفترض الباحث شوكنخت ان سبب الدوار يرجع الى التصاق جسيمات متكلسة بغطاء العضو الحسي للقناة الهلالية الخلفية. ولكن الباحث هول افترض أن سبب الدوار يرجع الى وجود جسيمات متكلسة ليست ملتصقة بغطاء العضو الحسي ولكن حرة الحركة في السائل الليمفي للقناة نفسها. وبناءا على هذه النظرية فقد استنبط الباحث ايبلي طريقة لازاحة الجزيئات من القناة الخلفية و توجيهها الى التجويف المدخلي للأذن الداخلية. تمت هذه الدراسة على عدد ٢٣٨ مريضا تم علاجهم بواسطة طريقة ايبلي تخلف منهم ٢٠ مريضا في المتابعة ليكون عدد المرضى ١٩٦. و قد تم مراجعة المرضى بعداسبوعين و أربعة أسابيع وثلاثة أشهر وستة أشهر و سنة من عمل طريقة ايبلي. وقد وجد أن نسبة نجاح هذه الطريقة ٩٧% بعد اسبوعين و ٩٤.٥% بعد عام من اجراء العلاج اذا تم علاج المرضى الذين ارتجع المرض لهم مرة ثانية ولكن تكون نسبة نجاح هذه الطريقة ٧٨% اذا لم يتم علاج المرضى الذين ارتجع المرض لهم مرة ثانية وهذا يدل على أهمية متابعة المرضى بعد العلاج. وقد كان عدد المرضى الذين حدث لهم مضاعفات مريضا واحدا. وقد اشتكى ٣٠% من المرضى من أعراض احساس خفة في الرأس بعداسبوعين من اجراء العلاج ولكن ٤% فقط استمر معهم هذا الاحساس. وقد خلصنا من هذا البحث أن طريقة ايبلي ناجحة وقليلة المضاعفات في علاج مرضى الدوار الوضعي الحميد وأن متابعة المرضى مهمة جدا بعد العلاج.

### SUMMARY

*To verify the effectiveness of Epley's particle repositioning maneuver we designed this prospective study that included 196 patients with BPPV and followed them up for one year. We found that Epley's maneuver had 97% success rate after two weeks and 94% after one year. Thirty percent of patients complained of lightheadedness in two weeks which dropped to 4% after one year. We concluded that Epley's maneuver is a very effective modality in managing BPPV with minimal complications and follow up is important in treating these patients.*

### INTRODUCTION

Benign Paroxysmal Positional Vertigo (BPPV) is the most common peripheral vestibular disorder (Nedzeliski et al., 1986 and Bath et al., 2000). It is characterized by bouts of vertigo lasting less than one minute, associated with nystagmus when the patient's head is moved into a position in the plane of the affected semicircular canal (SCC); commonly the posterior semicircular canal (PSC) (Herdman and Ronald, 1996). Schuknecht, 1962 applied the

theory of cupulolithiasis; attached particles to the cupula of the SCC; as a cause of this disorder. Hall et al., 1979 introduced the theory of canalolithiasis; free particles in the PSC. More recently Epley, 2001 introduced the concept of vestibular lithiasis to combine both theories. Particle repositioning maneuver (of which Epley's maneuver) have become the goal standard in treatment of this disorder (Epley, 1992).

## **PATIENTS AND METHODS**

Two hundreds and thirty eight (238) patients were included in this study. Diagnosis of posterior canal BPPV was based on typical patient's history and was confirmed by presence of typical nystagmus in Dix-Hallpike position. We performed the particle repositioning maneuver described by Epley, 1992. We preferred to offer the maneuver after at least one month of beginning of the symptoms. The maneuver started with the Dix-Hallpike position that always provoked the sense of transient vertigo with characteristic nystagmus. We waited for one minute after subsidence of nystagmus. Then the patient's head was rolled 90° to the opposite side. Then the patient was asked to lie on his opposite side keeping the head-shoulder relation. The patient was then asked to sit up in bed. Then the head was put in chin to chest position and finally the patient's head was put in neutral position looking forwards. The patient was kept in each position for at least two minutes or one minute after subsidence of nystagmus whichever longer. Every patient was given a group of instructions after the maneuver; to stay still for at least two hours in neutral position, sleep in semisitting position for three days not to sleep on the affected side for one week and then to practice normal life after that. Each patient was then reviewed at two weeks, one month, three months, six months and one-year time. The patient was asked to assess his subjective feeling of the result of the maneuver each review time as follows:

- Complete cure
- More than 50% cure
- Less than 50% cure
- No improvement

- Getting worse

Dix-Hallpike testing was done to each patient after at least one month of the maneuver and any recorded nystagmus was reported and correlated to the patient's subjective feeling. We did not rely on ENG for testing the patient.

## **RESULTS**

A total of two hundreds and thirty eight (238) patients with BPPV were treated by Epley's particle repositioning maneuver. This group of patients constitutes about 15% of a bigger series of patients presented to ENT department, Assiut university in the period between February 2000 and February 2001 complaining of vertigo. Forty two (42) patients were lost in follow up downing the patient's number to 196 patients. 113 patients (58%) were females with female to male ratio (1.3:1). The patient's age ranged from 18 to 70 years with mean age 44 years. The duration of symptoms ranged from one month to 20 years. Very recent patients were excluded from the study and usually waited one month for spontaneous resolution. The results of follow up of the patients are shown in table I.

After two weeks, ninety seven percent of patients were completely cured from vertigo. Four patients got more than 50% improvement. The maneuver was repeated to them and resulted in complete resolution of the symptoms in three of them. The fourth patient persisted with satisfactory but not complete improvement. The two patients with less than 50% improvement had undergone repeated maneuver with satisfactory but not complete improvement. One of those two patients;

sixty year-old lady; had highly recurrent attacks of vertigo with satisfactory results but recurrent disease over the year of follow up. Till now she had four maneuvers.

After four week, ninety nine percent success rate was achieved. One patient had more than 50% improvement. This patient had repeated maneuver that failed to give him complete cure. Another patient had less than 50% improvement. This was the patient with highly recurrent disease. The Epley's maneuver was repeated several times with fluctuant results ranging between more than and less than 50% improvement descending to baseline complaint on 6 months review and then up to more than 50% improvement by the end of one year. This patient refused to have surgery.

After three months, the success rate of the maneuver was 94%. Eleven patients had recurrence of symptoms but improved with repetition of Epley's maneuver. One patient got worse. This patient had less than 50% improvement on the second review (4 weeks) and had the maneuver repeated. This patient got severe repeated attacks of positional vertigo especially on rolling in bed with unsteadiness during walking. He was diagnosed to get horizontal canal BPPV as a complication of Epley's maneuver. The patient was treated with Brandt-Daroff habituation exercise (Brandt and Daroff, 1980) with complete resolution of vertigo and negative Dix-Hallpike test.

Six months review results showed approximatly the same results as at three months date with only one

patient got severe attacks and 11 patients having less severe attacks.

One-year review results showed 94.5% success rate with 11 patients with less than complete resolution.

Table II shows the results of Epley's maneuver with repetition of the maneuver when needed.

Table III shows the results if the maneuver had not been repeated (i.e.) if the patient had been discharged without following him up.

Considerable number of patients developed lightheadedness with minimal unsteadiness detected on review. Table IV depicts these patients

Dix-Hallpike test was done for every patient at least after one month and showed to be positive in all patients with less than complete resolution of symptoms.

#### Uncommon cases

- Two patients having bilateral posterior semicircular canal BPPV were treated. Epley's maneuver was done once at a time with complete resolution of symptoms.

- One patient had typical (right) BPPV and severe cervical osteophytation. For fear of cervical spine fracture the patient had the maneuver while fitting a rigid neck collar to fix the cervical spine. The angulation needed in Epley's maneuver was achieved using the operating theatre coach. One patient; 60-year-old lady, had highly recurrent BPPV with improvement of the condition after each maneuver for 3-4 months to recur back again.

**Table (I):** Follow up results of the patients

	2 weeks		4weeks		3 months		6 months		12 months	
	No.	%	No.	%	No.	%	No.	%	No.	%
Complete cure	190	97	194	99	184	94	184	94	185	94.5
â50% improv.	4	2	1	0.5	8	4	9	4.5	10	5
â50% improv.	2	1	1	0.5	3	1.5	2	1	1	0.5
No improv.	0	0	0	0	0	0	1	0.5	0	0
Getting worse	0	0	0	0	1	0.5	0	0	0	0

**Table (II)** success rate with repetition of Epley’s maneuver.

2 weeks		4 weeks		3 months		6 months		1 year	
No.	%	No.	%	No.	%	No.	%	No.	%
190	97	194	99	184	94	184	94	185	94.5

**Table (III)** success rate without repetition of Epley’s maneuver

2 weeks		4 weeks		3 months		6 months		1 year	
No.	%	No.	%	No.	%	No.	%	No.	%
190	97	188	96	176	90	164	84	153	78

**Table (IV)** lightheadedness on follow up

2 weeks		4 weeks		3 months		6 months		1 years	
No.	%	No.	%	No.	%	No.	%	No.	%
60	30	55	28	40	20	18	9	7	4

### DISCUSSION

The patient’s age and sex distribution agrees with the previously published data (Baloh et al., 1987). In his big series (2222 patients), Nedzilski, 1986 found that 17% were BPPV. Our group of patients constituted 15% of a bigger series (1573 patients). It was preferred, in our study, not to offer the maneuver to very recent cases and to wait at least for one month in order not to attribute the result to spontaneous recovery. ENG was not relied upon for diagnosing BPPV owing to its inability to

detect the torsional component of the nystagmus typical for posterior canal BPPV (Minor and Zee,1998). This study applied the patient’s assessment criteria suggessted by Epley, 1992 that was found to be very practical inspite of being subjective because the patient can not miss such a vigorous sense of vertigo. Dix-Hallpike test was done one month after the maneuver for fear of reactivation of the condition with further detachment of particles from the otoconia. Strict instructions were given to the patients as suggested by Massoud and Ireland, 1996. Epley,1992 had 80%

success rate after one week review, Parnes and Price-Jones, 1993 had 79% success rate after 3-4 weeks review while Herdman et al., 1993 had 90% success rate after 2 weeks follow up. Our higher success rate in this study (table II) may be due to the patient's choice with offering the maneuver only to those having typical history and nystagmus in Dix-Hallpike position. Also, waiting some time (one month) to effect separation of loose particles from the otoconia. In addition strict instructions after the maneuver may be of value. Nuti et al., 2000 did not find value to these instructions.

On two weeks review one maneuver was sufficient to cure 97% of patients. Repetition of the maneuver improved the rest. This may be because the first maneuver did not direct all the detached particles to the vestibule along the PSC.

On four weeks review, the results improved (99%) with repetition of the maneuver for less improved patients. Only one patient had less than 50% improvement. This was the patient with highly recurrent disease.

On three months follow up those patients who developed recurrent minor attacks ( 11 patients) were offered repeated maneuver with satisfactory results. One patient got worse attacks with unsteadiness. He was the same patient suffering from less than expected result. He was followed up more frequently and diagnosed to have horizontal canal BPPV( proved also by ENG). It was suggested that this was a complication of Epley's maneuver and treated with Brandt-Daroff (1980) habituation exercise with complete cure but residual lightheadedness. The same complication was described by Herdman and Ronald, 1996.

Six months and one year review results showed approximately the same results with 11 patients got mild but less frequent attacks but improved with further maneuvers. The patient who had severe recurrent attacks on six months review date had highly recurrent attacks with improvement each time after the maneuver and recurrence each 3-4 months. Till now she had four maneuvers. This may be attributed to a degenerative process effecting frequent detachment of free particles from the otoconia every now and then.

Studying the Epley's maneuver results showed that it has success rate 78% after one year if it is offered once without following the patient up while it will be 94.5 % if it is repeated when needed according to review results. This reflects the value of reviewing the patient frequently and not discharging him on first response.

Lightheadedness was the complaint of considerable percentage of patients (30%) after two weeks. This may be explained by the presence of persistent fine particles that can elicit minor symptoms but not definite vertigo. Another possible explanation is that the presence of canaliths may cause some damage to the inner ear for which adaptation must take place (Ruckenstein, 2001). With progress of time only seven patients persisted to have lightheadedness (4%) but non of them was troublesome. This may be because the process of adaptation had taken place.

### **Conclusions**

The Epley's particle repositioning maneuver is a very successful treatment for BPPV both on short and long term. Following the patients up with repetition of the maneuver if needed is mandatory to get the best results. Minimal complications of the

maneuver was recorded that could be managed accordingly. Lightheadedness that could develop after the maneuver usually settles spontaneously.

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**Table (III)** success rate without repetition of Epley's maneuver

2 weeks		4 weeks		3 months		6 months		1 year	
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**Table (IV)** lightheadedness on follow up

2 weeks		4 weeks		3 months		6 months		1 years	
No.	%	No.	%	No.	%	No.	%	No.	%
60	30	55	28	40	20	18	9	7	4