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In Adult Patients With PC-BPPV, Is the Semont Maneuver Effective in Reducing Symptoms of Vertigo?

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In Adult Patients with PC-BPPV, Is The Semont Maneuver Effective In Reducing Symptoms Of Vertigo?

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A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

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ABSTRACT

OBJECTIVE: The objective of this selective EBM review is to determine whether or not in adult patients with PC-BPPV, is the Semont Maneuver effective in reducing symptoms of vertigo?

STUDY DESIGN: Review of three published, randomized controlled trials (two double-blind and one single blinded), all English language.

DATA SOURCES: The three randomized controlled trials that were used for this review were found using PubMed and Medline. Articles were selected based on relevance and that the outcomes were patient oriented.

OUTCOME(S) MEASURED: Dix-Hallpike Test performed before and after the Semont Maneuver to asses nystagmus and questionnaires/self reported symptom status after the Semont Maneuver to asses resolution of vertigo.

RESULTS: Mandala et al. and Chen et al. compared the Semont Maneuver to a Sham treatment. Salvinelli et al. compared the Semont Maneuver to a no treatment group. All three studies demonstrated statistically significant improvement in patient's vertigo after receiving the Semont Maneuver compared to other treatment strategies. Salvinelli et al. demonstrated that cure rates with the Semont Maneuver (94.2%) were significantly higher and more effective than the no treatment group (35.4%). Mandala et al. determined that at the 1 hr and 24 hr follow up, 79.3% and 86.8% of subjects undergoing the Semont Maneuver recovered from vertigo, respectively. Chen et al. concluded that on the fourth day, 84.62% of patients being treated with the Semont Maneuver showed complete resolution of vertigo symptoms compared to 14.29% of patients receiving Sham treatment.

CONCLUSIONS: The results of these three randomized controlled trials suggest that the Semont Maneuver is a safe, easily performed, and effective treatment modality for patients with PC-BPPV.

KEY WORDS: BPPV, Semont Maneuver

INTRODUCTION

Benign Paroxysmal Positional Vertigo (BPPV) is a disorder of the inner ear that is caused by free-floating calcium carbonate crystals (otoconia) that are displaced from the macula of the utriculus and enter the semicircular canals. The posterior semicircular canal is most commonly affected, occasionally the lateral semicircular canal, and rarely the anterior semicircular canal. Movement of otoconia within the semicircular canals causes variations in the endolymphatic pressure, which is manifested in a patient as vertigo and nystagmus. BPPV is the most common form of positional vertigo and is the most common vestibular disease. [1] Its prevalence increases with age but is often underestimated in older adults. In a study involving the geriatric population, it was found that of the 77% of subjects that had a balance disorder, 9% had BPPV.[2] It has been estimated from physician data, laboratory data, and failed treatment costs that each patient with BPPV spends $2009.63 in health care costs.[3] In the United States, BPPV accounts for 18% of visits to dizziness clinics each year.[4]

Being able to correctly diagnose BPPV and identify the cause is essential to the effective treatment of the condition. The majority of cases of BPPV are idiopathic and are thought to be triggered by a change in head position such as lying down, getting up, or rolling over in bed. However, some of the identifiable causes of BPPV include Vestibular Neuronitis, Meniere Disease, inner ear ischemia, trauma, surgery, and whiplash injuries. [5]

The standard treatment for patients with BPPV is a particle-repositioning maneuver. The most well-known and commonly used maneuvers include the Epley and Modified Epley Maneuvers.[6] Patients with BPPV are often educated to perform Brandt-Daroff exercises during an attack in order to end the symptoms of vertigo, however these exercises are less effective in

relieving symptoms than particle-repositioning maneuvers.[7] Pharmacologic therapy is not useful for brief episodes of vertigo associated with BPPV. However, vestibular suppressants may be helpful in patients who have difficulty tolerating particle-repositioning maneuvers due to discomfort and nausea. Betahistine is commonly given and rarely is Meclizine used.[8]

Currently, particle-repositioning remains the therapy of choice in the treatment of BPPV. The Semont Maneuver is an additional particle-repositioning maneuver that may be used to improve vertigo symptoms in patients with posterior canal BPPV (PC-BPPV).

OBJECTIVE

The objective of this selective EBM review is to determine whether or not in adult patients with PC-BPPV, is the Semont Maneuver effective in reducing symptoms of vertigo.

METHODS

All three studies selected for this review focused on a population of adult (> 18 y/o) patients with clinically diagnosed PC-BPPV. The intervention under investigation is the Semont Maneuver versus the comparison groups of Sham treatment and no treatment. All three studies measured improvement of vertigo symptoms subjectively by questionnaires/self reported symptom status and objectively by patients' response (nystagmus) to Dix-Hallpike testing. Two of the studies chosen for this review were double-blinded randomized controlled trials and one of the studies was a single-blinded randomized controlled trial.

The author completed a search using PubMed and Medline web databases using key words "Benign Paroxysmal Positional Vertigo" and "Semont Maneuver." All three articles were published in English between 2004 and 2012 in peer-reviewed journals. The studies were selected based on their relevance to the clinical question and focused on outcomes that were patient oriented (POEMs).

Inclusion criteria included studies that were randomized controlled trials published after 1999 that focused on patient oriented outcomes (POEMs). Subjects selected were adult (> 18 y/o) patients with diagnosed unilateral PC-BPPV via Dix-Hallpike Testing. Exclusion criteria included patients < 18 y/o and patients with lateral or anterior semicircular canal BPPV. Summary of statistics reported or used include P-values and mean change from baseline.

OUTCOMES MEASURED

The outcome measured in all three studies was improvement of vertigo symptoms. After the Semont Maneuver was performed, the outcome was assessed subjectively by questionnaires/self reported symptom status and objectively by patients' response (nystagmus) to Dix-Hallpike testing. Successful treatment was defined as a negative Dix-Hallpike test and absence of vertigo.

RESULTS

All three studies were randomized controlled trials that evaluated the efficacy of the Semont Maneuver compared to either Sham or no treatment groups. The clinical and demographic baseline characteristics were not significantly different between the two groups being compared in all three studies. Each study utilized dichotomous data with intention-to-treat analysis. The relative benefit increase (RBI), absolute benefit increase (ABI), and numbers needed to treat (NNT) were calculated using efficacy rates from the Semont Maneuver, Sham treatment, and no treatment groups. These values were derived from experimental event rate (EER) and controlled event rate (CER) using clinical success percentages defined as resolution of vertigo. In each study, all patients completed the therapy and none were lost during the follow up period.

Table 1: Demographics & Characteristics of included studies

Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Chen (2012) [8]	RCT	128	Semont Group: 53.55 yrs ± 9.91 yrs Sham Group: 52.35 yrs ± 8.55 yrs	- Pts with symptoms of unilateral PC-BPPV and diagnosed via Dix-Hallpike Test.	- Pts with bilateral PC-BPPV or traumatic BPPV. - Pts with BPPV lasting > 2 months - Pts with horizontal or anterior canal BPPV	0	- Semont Maneuver
Salvinelli (2004) [9]	RCT	156	Semont Group: mean = 73 yrs (range = 70-78 yrs) No Tx Group: mean = 75 yrs (range = 72-79 yrs)	- Pts with diagnosed PC-BPPV according to Dix-Hallpike Test.	- Pts with asymmetrical hearing loss - Pts with neurological diseases - Pts with poor general health conditions - Pts with an abnormal BP - Pts who have used Ototoxic drugs	0	- Semont Maneuver
Mandala (2012) [10]	RCT	342	Semont Group: 62.1 yrs ± 15.1 yrs Sham Group: 63.9 yrs ± 16.2 yrs	- Pts with diagnosed unilateral PC-BPPV according to Dix-Hallpike Test.	- Pts with bilateral PC-BPPV - Pts with multiple canal atypical positional nystagmus - Pts previously treated with repositioning maneuvers	0	- Semont Maneuver

In Mandala et al, a total of 342 adult (> 18 y/o) patients with diagnosed unilateral PC-BPPV via Dix-Hallpike testing were recruited from 7 Otoneurology units in Italy. Excluded from the study were patients with bilateral PC-BPPV, multiple canal atypical positional nystagmus, or patients previously treated with repositioning maneuvers. Patients were randomized into a treatment group by Semont Maneuver or Sham treatment. Sham treatment consisted of performing the Semont Maneuver but for the unaffected ear. The Semont Maneuver and Sham treatments were performed once and patients were assessed at 1 hr and 24 hrs. Patients in both groups whose symptoms of BPPV hadn't resolved at the 24 hr follow up were treated with the Semont Maneuver. Patients were followed for 2 weeks and were instructed to return to the hospital if BPPV symptoms persisted or reoccurred to be treated again with the Semont Maneuver. 86.8 % of patients receiving the Semont Maneuver had complete resolution of symptoms at 24 hrs post intervention compared to 0.00% in the Sham treatment group. When comparing the two groups, the Semont Maneuver group was statistically more effective than the Sham treatment group ($P < 0.0001$). The results are summarized in Table 2.

Table 2: Semont Maneuver vs Sham Treatment at 24 hrs.

	CER	EER	RBI	ABI	NNT	P-Value
% Cure Rate	0.00	0.868	1.00	0.868	2	< 0.0001

In Salvinelli et al, 156 adult (> 18 y/o) patients were selected after being diagnosed with unilateral PC-BPPV via Dix-Hallpike testing. Subjects were enrolled at the Department of Otolaryngology of Campus Bio Medico University in Rome, Italy. Patients excluded from the study had a history of asymmetrical hearing loss, neurological disease, poor general health conditions, abnormal blood pressure, and prior use of ototoxic drugs. Patients with BPPV were randomized into either a Semont Maneuver group or no treatment group. Patients in the Semont

Maneuver group were treated one to three times at 1-week intervals until resolution of their symptoms. At the end of each treatment, a 6-month follow-up was performed. In the Semont Maneuver group, 94.2% of patients had a resolution of symptoms after 3 sessions of Semont Maneuver compared to only 34.6% in the no treatment group. When comparing the two groups, the Semont Maneuver group was statistically more effective than the no treatment group ($P < 0.001$). The results are summarized in Table 3.

Table 3: Semont Maneuver vs No Treatment after 3 sessions.

	CER	EER	RBI	ABI	NNT	P-Value
% Cure Rate	0.346	0.942	1.72	0.596	2	< 0.001

In the Chen et al. study, 128 adult (> 18 y/o) patients with unilateral PC-BPPV were enrolled from the neurology outpatient clinic at Changzheng Hospital. Patients were diagnosed after having undergone bedside vestibular testing, including the Dix-Hallpike test, Rinne test, Weber test, Romberg's test, positional test, and a Fukuda test. Patients excluded from the study had bilateral PC-BPPV, traumatic BPPV, BPPV lasting more than 2 months, or BPPV involving the horizontal or anterior semicircular canals. Patients were randomized into a treatment group by Semont Maneuver or a Sham treatment group. In the Semont Maneuver group, treatment was repeated until resolution of symptoms or until 4 maneuvers had been performed. Sham treatment consisted of a Semont Maneuver but for the unaffected side. Patients in both groups received treatment with the Semont Maneuver if they hadn't significantly improved by the fourth day. On the fourth day after treatment, 84.62% of patients in the Semont Maneuver group were free of symptoms compared to 14.29% in the Sham group. There was significant difference in the cure rate between the two groups ($P < 0.001$). The results are summarized in Table 4.

Table 4: Semont Maneuver vs Sham Treatment at day 4.

	CER	EER	RBI	ABI	NNT	P-Value
% Cure Rate	0.1429	0.8462	4.92	0.7033	2	< 0.001

DISCUSSION

This systematic review analyzed three randomized controlled trials to determine if the Semont Maneuver is effective in the treatment of vertigo. Overall, the data demonstrates that the Semont Maneuver is effective in resolving symptoms of vertigo in patients with PC-BPPV. All three studies showed statistical significance.

In 1983, Alain Semont presented a new therapeutic technique for the treatment of PC-BPPV known as the Semont Maneuver. It is an easily and quickly performed maneuver that can be performed at a patient's bedside as part of a clinician's routine examination. In combination with the Dix-Hallpike Test, patients with PC-BPPV can be diagnosed and treated at bedside without the use of blood work or radiographic studies. Many practitioners recommend the use of IR video goggles for monitoring eye movement during positioning, but this equipment is not necessary to accurately diagnose and treat PC-BPPV.[9] Thus, the Semont Maneuver is highly cost effective and no special equipment is needed.[9] It is recommended that every general practitioner and geriatrician be able to use this maneuver to provide relief of patient's symptoms.[10]

Currently there are no absolute contraindications to use this therapeutic treatment; however, relative contraindications include any orthopedic condition that limits patient mobility due to the brisk movement that occurs during the maneuver.[10] When performing this maneuver, there is a chance that free-floating particles may enter another canal, most commonly from the posterior to the horizontal semicircular canal. This most likely occurs when the head is brought

upright but not maintained in the proper position.[9] Common minor side effects that may be experienced include nausea, vomiting, loss of balance, pallor, and sweating.[11]

Various limitations existed in the three randomized clinical trials. In Salvinelli et al, the study was only single blinded and thus the results may have been subject to bias by the un-blinded investigator who performed the Dix-Hallpike testing both before and after the intervention. In both Chen et al. and Salvinelli et al, patients were recruited from a single Hospital whereas in Mandala et al patients were recruited from 7 Otoneurology units throughout Italy. A larger demographic population may have helped increase the strength of the results. In Mandala et al. and Chen et al, each study had short-term follow up periods of 2 weeks and a few days respectively, which hinders the strength of their findings.

CONCLUSION

In conclusion, this systematic review of three randomized controlled trials demonstrates that the Semont Maneuver is effective in the treatment of PC-BPPV. The data collected in all three studies showed statistical significance in improving patient's symptoms of vertigo. Particle-repositioning remains the therapy of choice for the treatment of PC-BPPV and this new body of evidence suggests that the Semont Maneuver be strongly considered as a first line therapy in patients with PC-BPPV. Further studies evaluating the relapse rates of the Semont Maneuver are warranted. Lastly, a systematic review comparing the efficacy of the two most common particle-repositioning maneuvers, Epley and Semont, is warranted.

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