



## Case Report

## Long Term Medical Treatment and Vestibular Rehabilitation in A Patient with Complicated Active Bilateral Meniere's Disease

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### ABSTRACT

**Background:** Bilateral Meniere's disease presents with attacks of vertigo leading to severe imbalance and oscillopsia. Sometimes, treatment of bilateral Meniere's disease is challenging. The following case report presents an appropriate and successful management for a complicated Bilateral Meniere's disease.

**Presentation of Case:** Patient was a 42 years male referred with severe attacks of vertigo, severe to profound bilateral hearing loss and severe tinnitus as well as imbalance. Vestibular assessment was done with electronystagmography, head impulse test, cervical and ocular vestibular evoked myogenic potential that showed bilateral and widespread vestibular abnormality in the semicircular canals and otolith systems. Patient had different medical treatments before referring to us and we started some medical and rehabilitation treatments based on his unstable conditions and followed him up for over three years.

**Discussion:** Vestibular rehabilitation is an approach for the management of many vestibular abnormalities such as Meniere's disease. It could help to resolve vertigo and imbalance in acute and chronic stage of Meniere's disease.

**Conclusion:** Vestibular rehabilitation may be helpful in controlling the acute symptoms and helps to improve imbalance and oscillopsia.

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### Introduction

Meniere's disease is a common cause of episodic vertigo, ear fullness, hearing loss and tinnitus and vertigo could be very disabling [1]. End stage of Bilateral Meniere's disease leads to severe imbalance and oscillopsia. Medical treatment is useful in controlling the attacks of vertigo and nausea but it is not a cure, and the resulting progressive disease leads to imbalance and oscillopsia. Sometimes, the treatment of bilateral Meniere's disease is challenging and in some cases including our patient has very severe symptoms.

There are different opinions about the use of vestibular rehabilitation in the treatment of Meniere's disease. In

the past, because of the unstable nature of the disease and low positive consequence related to other vestibular disorders, rehabilitation is only used after surgery for controlling the outcomes [2]. Some studies also did not find it as a very useful treatment for Meniere's disease and suggested to use vestibular rehabilitation after destructive procedures [3]. In contrast, it is reported that it may be helpful in the recovery of patients with Meniere's disease [1] and even could be useful in the treatment of active fluctuating Meniere's disease and results in decreasing anxiety and improving confidence in daily abilities [4].

This case report presents over 3 years medical treatment and vestibular rehabilitation for a complicated patient with severe vertigo and imbalance because of bilateral and active Meniere's disease. It focuses on patient's condition and rehabilitation outcomes in active phase of the disease and after ablation procedure.

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**Presentation of Case**

Patient was a 42 years male and had episodic vertigo lasting for several hours. He also had hearing loss, low pitch tinnitus, ear fullness, positional vertigo, oscillopsia, imbalance, gait abnormality and history of multiple falling down. Patient was on Betaseric and Cinnarizine and salt restricted diet for several years. Despite treatments, he had severe vertigo and his disease was active.

Auditory assessment of patient showed pan-frequency severe and profound sensorineural hearing loss in the left and right ear, respectively. Tympanogram was normal (type An) in both ears.

Vestibular assessment included electronystagmography (ENG) (Hortmann, otometrics, Denmark), Electrocochleography (EP25, Intracoustic, Denmark), Halmagyi Head Impulse test, cervical and ocular vestibular evoked myogenic potential (cVEMP and oVEMP) (EP25, Intracoustic, Denmark), Dizziness handicap inventory (DHI), Romberg test, Fukuda's stepping test, Dynamic Visual Acuity test (DVA) and tandem gait. Electrocochleography (EcochG) failed to show any repetitive waves because of the severity of hearing loss.

Patient was wearing behind the ears (BTE) hearing aids. He complained of fluctuating, slowly progressive hearing loss and low satisfaction about his hearing aids. Difficulty in using hearing aid is common in patients with Meniere's disease [5]. The dispensing audiologist was consulted for proper changes in amplification.

In ENG, patient had normal function in ocular motor tests. There was no spontaneous or positional nystagmus. Moreover, Dix-Hallpike test, side-lying and roll test were normal (there was no nystagmus or vertigo).

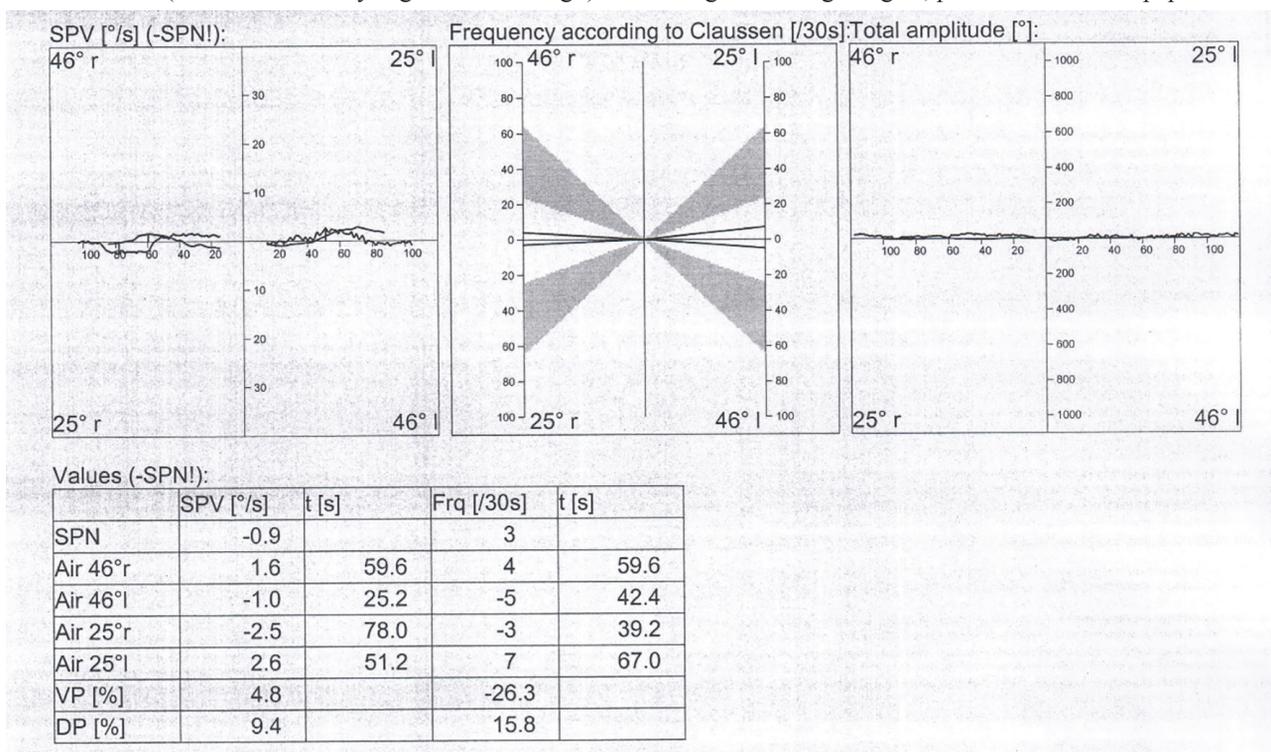
Caloric tests showed that bilateral weakness (under 3 degree nystagmus with warm and cold stimulus in both sides) (Figure 1), and Halmagyi Head Impulse test were abnormal. It showed overt nystagmus in both sides. The cVEMP and oVEMP were absent (no wave) in both sides (Figure 2).

These results represent bilateral and widespread vestibular abnormality in semicircular canals and otolith systems.

Balance tests were also abnormal for Romberg, fukuda's stepping and tandem gait test. Patient was unable to maintain balance especially in eye-closed situation. DHI score was 56 and DVA showed 9 line differences between static and dynamic visual acuity.

In otolaryngologic examination, patient was diagnosed as bilateral active Meniere's disease progressing to bilateral vestibular dysfunction (BVD). Bilateral Meniere's disease is considered as one of the main causes of BVD [6].

Patient was followed for over 3 years from September 2014 to December 2017. The patient was on different types of medications and vestibular rehabilitation. He had informed consent about assessments and treatments. All procedures were in agreement with the ethical standards of the 1964 Helsinki declaration. In the beginning of treatment, patient received 5 days of injections of 4mg Dexamethasone in the right ear and 24 mg /day Betaseric and 25 mg Hydrochlorothiazide continually. Patient also referred for vestibular rehabilitation synchronously. At first, the vestibular rehabilitation mainly focused on adaptation and gaze stability exercises due to both static and dynamic abnormalities (Table 1, left column). The exercises were performed at least three times each day. For near and small targets, patient looked at his index finger. For large targets, patient used a newspaper.



**Figure 1:** Abnormal results (bilateral weakness) in Caloric tests.

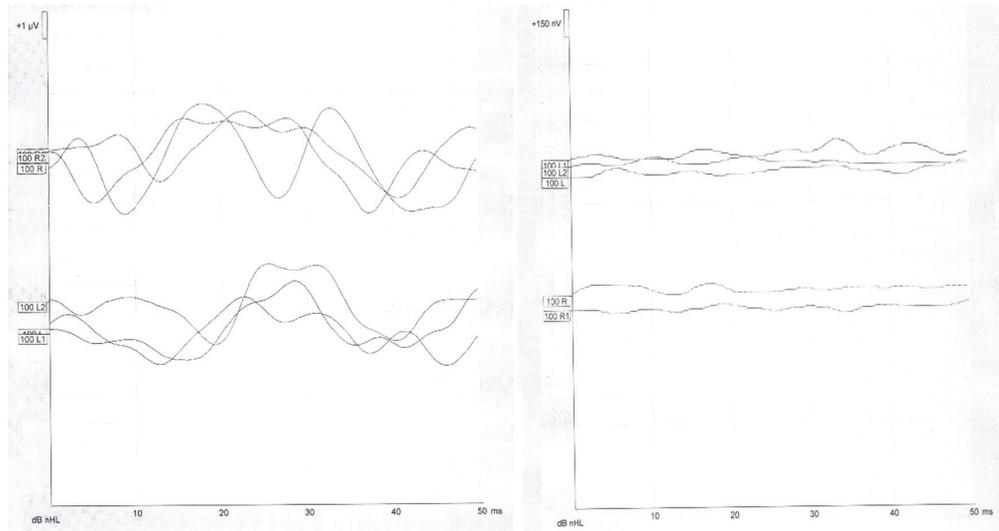


Figure 2: Bilateral absent response (no wave) in cVEMP (right) and oVEMP (left).

Table 1: Main exercises used by patient

Adaptation and gaze stability exercises	Substitution exercises
Near target, horizontal X1 exercise	Standing, open and closed eyes
Near target, vertical X1 exercise	Walking in straight line
Distant target, horizontal X1 exercise	Walking around a room at different directions
Distant target, vertical X1 exercise	Walking close to a wall with closed eyes
Near and large target, horizontal X1 exercise	Walking and sitting on two distant chair
Near and large target, vertical X1 exercise	Horizontal and vertical anticipation exercise
Diagonal gaze stability exercise	Standing and walking on soft surface
Near target, horizontal X2 exercise	Standing and walking on dark room
Near target, vertical X2 exercise	Standing with feet hold closer
Walking with fixed gaze	Walking in straight line with feet hold closer
Walking with horizontal head movement and fixed gaze	Bending and stretching back while sitting and standing
Walking with vertical head movement and fixed gaze	Walking beside obstacles
Going up and down a trampoline with fixed gaze.	Walking on obstacles (pillow)

These treatments succeeded to decrease DHI score from 56 to 28 over three months and significantly improved dynamic visual acuity (DVA) as well as balance function (Romberg and tandem gait). In the following year, patient had series of several vertigo attacks every 3 to 5 months. These episodes were controlled with oral medication and intra- tympanic injections of steroids. Patient’s dynamic visual acuity improved by vestibular rehabilitation but all signs and symptoms were fluctuating with every attack. In October 2016, patient developed very severe episodes of vertigo that severely impacted his balance especially walking. In this stage, patient was scheduled for tympanostomy and Gentamicin ablation for the left ear. This treatment is approved in this severe condition [1]. After ablation, ENG including Kobrak’s test showed inactive left ear but hearing remained the same. Since Gentamicin ablation, patient has not had any episode of vertigo but has experienced imbalance (standing and walking) associated with impaired dynamic visual acuity. In this stage, patient was treated by substitution exercises of vestibular rehabilitation (Table 1, right column). These exercises were also performed at least three times each day. During this treatment, his walking changed to normal in 4 months. Now, patient does not have vertigo and just complains of minimal abnormality in balance.

The final DHI score was 32 and patient continues with his vestibular rehabilitation program.

### Discussion

Vestibular rehabilitation is an approach for the management of many vestibular abnormalities such as Meniere’s disease. This case report showed a successful results of vestibular rehabilitation in both active phase and after ablation in bilateral Meniere’s disease and shows the possibility of controlling vertigo in active phase with vestibular rehabilitation. In the past, positive outcomes of vestibular rehabilitation were reported for acute phase of peripheral vestibular disorders [7] or severe bilateral vestibular loss [8]. Although unstable nature of Meniere’s disease makes it more challenging for rehabilitation. In addition, chronic symptom of Meniere’s disease could be treated by vestibular rehabilitation but traditionally, this procedure is performed after destructive procedure for imbalance and after procedure disabilities [4] and it is not assumed as treatment in the period before destructive procedures. Some other studies also showed the benefits of vestibular rehabilitation in the treatment of Meniere’s disease [9] even in active fluctuating one [4] that is similar to our result.

Currently, vestibular rehabilitation is used for the treatment of unilateral, bilateral, peripheral, central, acute and chronic vestibular abnormalities [7] and could improve balance function [2] and have similar positive results on young or old patients [10]. Due to the therapeutic results of some medications such as betahistine [1, 11], it seems that the combination of medication and vestibular rehabilitation may be more helpful in the treatment of patients with vestibular abnormalities [12] and even in acute stage could decrease the need of medication [7]. The vertigo attacks of Meniere's disease profoundly influence patients and treatment of Meniere's disease is improving over the years but still remains controversial [4]. The combination of medication and vestibular rehabilitation may be helpful in Meniere's disease.

Vestibular ablation is performed in severe condition but in some patients including bilateral Meniere's disease could result in severe imbalance and disability by destroying the remaining vestibular function [1]. However, chemical ablation using gentamicin in patients with noteworthy sensorineural hearing loss is considered as a choice and usually is used in severe cases of active Meniere's disease [1]. This procedure could be successful in long term control of vertigo [13] even after single injection [14].

The major limitation of the present case study is reporting one patient, unfortunately vestibular rehabilitation is not a common treatment in our country yet and many patients and physicians prefer only medical treatment. We hope to encourage our specialist to use vestibular rehabilitation with usual medical therapies. Also, there are fewer numbers of patients with bilateral Meniere's disease and this severity of symptoms. Severe symptoms of bilateral Meniere's disease often prevent patients from participation in vestibular rehabilitation especially in acute phase of disorder.

## Conclusion

Vestibular rehabilitation may be helpful in controlling the active symptoms and improves

Balance function and oscillopsia after destructive treatment in bilateral Meniere's disease.

**Conflict of interest:** None declared.

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