

Effect of transtympanic ventilation tube insertion in intractable Meniere's disease

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Objectives:

Transtympanic ventilation tube as a treatment option for Meniere's disease has been reported, but the results have been controversial. As a treatment for patients with intractable Meniere's disease, insertion of a ventilation tube into the tympanic membrane was carried out, and the effect of therapy was analyzed.

Methods: Five patients (3 males, 2 females; age range, 51-79 years) with active Meniere's disease received ventilating tubes in the affected ear and postoperative changes in symptoms (i.e., incapacitating vertigo and hearing loss) were investigated. The efficacy of treatment on vertigo attacks and hearing loss with this disease was evaluated according to AAO-HNS (1985) criteria.

	1	2	3	4	5	media n
age	79	72	51	66	70	67,6
sex	male	male	female	female	male	
Affected side	right	left	right	right	right	
Preoperative duration(moths)	38	112	16	45	24	57
Posttreatment duration(months)	50	44	42	45	44	45
Hearing level	unchanged	unchanged	unchanged	unchanged	worse	
Cotrol of vertigo	substantial	subsutantial	insignificant	complete	insignificant	
Ventilating tube	+	-	-	-	-	
Ear drum		+	+	+		

Table 1: Patients sex, age, affected side and duration for medical treatment before and after tube insertion. Condition of ventilating tubes and ear drums, control of vertigo, and hearing level in five patints at 42 moths of treatment

Results

Five patients with intractable Meniere's disease who suffered intensive vertigo attack for the duration from 15 months to 112months (median= with conservative medical treatment .

The preoperative duration of illness lasted from 15 months to 112months.

The postoperative follow-up lasted from 42 months to 50 months(median=45months)

The long-term evaluation of each patint was done at a 42 month period after the tube insertion.

In four out of five patients, tube were extruded spontaneously within 2 years after insertion .

Chronic perforation of the tympanic membrane was observed without one patient.(Table 1)

Control of vertigo

At 24 months of treatment, one of five patients showed complete control of vertigo, and three did substantial and one insignificant control.

At 42 months of treatment, one of five patients showed complete control of vertigo, and substantial control fell down from three to two and insignificant control rose from one to two.

We performed another treatment for two cases showed insignificant control of vertigo.

One case was due to delayed endolymphatic hydrops.

Delayed Endolymphatic Hydrops (DEH) is a disease entity that must be distinguished from idiopathic

endolymphatic hydrops. Transtympanic injection of gentamicin was adopted to this case.

The other one had endolymphatic sac decompression surgery at 42 months after insertion of tube ,and since then no occurrence of vertigo has been seen.(Table 1 and 2)

Degree of disability

At 24 months of treatment, the degree of disability was improved in four patients and unchanged in one with no patients showing worse disability, while 18 months later the number of degree of disability had no change. (Table 2)

Changing in hearing level

After tube placement, a hearing decrease greater than 10 dB occurred in one case. There was no hearing change in the others. There did not seem to be any change in tinnitus. .(Table 1 and 2)

Discusion

Meniere's disease is cyclical and unpredictable condition , and it is stated that two-thirds of patients Will improve without treatment¹⁾. Although the precise cause of menieres disease remains unknown, changes in

Ambient pressure are known to be associated with an improvement in symptoms.

The insertion of ventilation tubes in the treatment of Meniere's disease was first introduced by Tumarkin (1966).

He suggested the hypothesis that phases of underpressure in the middle ear are associated with consecutiveimpairment of labyrinthine function by pressure transmission through the round window²⁾ .

Montandon *et al.* (1988) confirmed the positive effect of ventilation tubes on vertigo,suggesting that patients with endolymphatic hydrops are particularly sensitive to middle ear pressure³⁾.

The porpose of the present study is to investigate the effectiveness of ventilation in middle ear on un-controlled Symptoms of Meniere'sdisease.

The insertion of transtympanic ventilation tubes was reported to be effective for the suppression of vertigo in over 70 % of the elderly patients by Ballester *et al*⁴⁾.(2002).

On the other hand, some other investigators (Hall & Brackmann 1977, Maier *et al.* 1997) could not find any beneficial effect and considered the earlier positive findings a placebo effect⁵⁾ .

Our results showed that tube insertion in the affected ear could decrease the vertigo spells in four of five cases at 24 months after the treatment. After a 42 month follow-up ,

effectiveness of tube insertion seemed to decrease and this result was compatible with the slight fall of disability level in patints seen in the same period.

In a short-term observation (at 24 months after treatment), our results in respect to controlling vertigo were similar to the results of Ballster et al.

On the other hand, middle ear ventilation had no beneficial effect on patients' hearing loss troughout the term observed.

Kimura et al first demonstrated a reduction in endolymphatic hydrops after ventilation tube placement in animal studies. He suggested improved oxygen in middle ear and inner ear may reduce inner ear of Meniere's disease⁶⁾ .

Kadriye suggested there are several hypotheses that explain the effects of pressure variations on the ear with endolymphatic hydrops. Initially, it was thought that an increase in middle ear pressure may cause decongestion of the labyrinthine vascular bed so that drainage of the endolymphatic duct and sac is improved. These hypothesis seem to support the application of ventilating tubes for the patients suffering from Meniere's disease⁷⁾ .

The number of cases in our study is too small to predict the outcome of the present therapy, and the precise explanation for the effect of ventilating tube remains unclear. However, as far as our results go, tube insertion could

be a method of choice for some Meniere's disease patients with persistent spells of vertigo, because its procedure is simple and less-invasive. If the effectof the tube remains insufficient, gentamicin and steroid treatment can be

easily administered

via the tube.

Conclusions:

This treatment might have short-term effects in reducing persistent vertigo in some patients with Meniere's disease, and so might offer an additional treatment option because of the simple, less-invasive procedure.

References

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	24M	42M
Control of vertigo		
complete	1	1
substantial	3	2
limited	0	0
insignificant	1	2
worse	0	0
Disability level		
improved	4	3
unchanged	1	2
worse	0	0
Hearing level		
improved	0	0
unchanged	4	4
worse	1	1

Table 2: change in the number of patints and levels in vertigo, disability and hearing at 24 and 42 months of treatment

Control of vertigo determined by the numeric value		0 complete	1~40 substantial	41~80 limited	81~120 insignificant	>120 worse	Alterati on to another treatment
Montandon(1998)	28	20 (71%)	1 (4%)	2 (7%)	2 (7%)	3 (11%)	0
Thomsen(1998)	14	5 (36%)	4 (29%)	3(21%)	1 (7%)	0	1(7%)
Sugawara(2003)	7	0	5 (71%)	1 (14%)	1 (14%)	0	0
Park(2009)	22	2 (9%)	5 (23%)	8 (36%)	7 (32%)	0	0
Kuruma(2015)	5	1 (20%)	2(40%)				2(40%)

Table 3 : comparison with the past another literatures about insertion of trunstympanic vebtilation tube to intractable meniere's disease patients 00