

Incidence of Hypothyroidism in Meniere's Disease

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ABSTRACT

Introduction: Meniere's disease is a disorder of the membranous labyrinth of the inner ear manifesting as vertigo, tinnitus, sensory neural hearing loss and aural fullness of known or unknown origin. Some patients may present after years into typical forms. The endocrine disorders, especially hypothyroidism and the factors like inflammation, trauma, otosclerosis, autoimmunity explains the multifactorial causation for the basis of Meniere's disease. Endolymphatic hydrops is the pathologic term named for the defective regulation of endolymph volume with respect to production and absorption. However, hyper production of endolymph cannot be excluded. The cause of Meniers disease is multifactorial so clinical features of repeated attacks of variable duration cannot be explained satisfactorily based on single causation.

Aim: To study the incidence of hypothyroidism in Meniere's disease and to assess the success rate of improvement in subjective symptoms after treatment.

Materials and Methods: The study was carried out on total 35 out patients who were clinically diagnosed of Meniere's disease and of these 35 patients, 12 patients were found to have hypothyroidism. All patients with hypothyroidism were treated with oral thyroxin supplements and they were evaluated clinically at 3 weeks, 3 months and 6 months interval for the improvement in subjective symptoms on outpatient basis.

Results: In our study, the subjective improvement of all symptoms was seen in all cases of Meniere's disease with hypothyroidism after 12 weeks of treatment.

Conclusion: The improvement in clinical symptoms after treatment demonstrates an association between Meniere's disease and hypothyroidism which was found to be significant. Hence, clinicians should consider screening patients with Meniere disease for thyroid dysfunction who are not already taking supplements.

Keywords: Autoimmunity, Endolymph, Hydrops, Labyrinth, Pure tone audiometry, Tinnitus, Vertigo

INTRODUCTION

Meniere's disease is a disorder of labyrinth with constellation of symptoms like progress of deafness, tinnitus, vertigo and aural fullness, it is most likely seen in the age group of 40-60 years, it is usually unilateral but can be bilateral [1]. The aetiology of Meniere's disease is multifactorial like allergy, adrenal pituitary insufficiency, hypothyroidism, stenosis of the internal auditory canal, trauma, and combination of above. Available pathologic studies suggest overproduction or underproduction of endolymph [2]. There are many proposed pathophysiologic mechanisms among which many suggest an abnormal immune mechanism [3].

The symptom of vertigo is seen in 67% of patients with hypothyroidism. Attacks are usually mild and brief, and are not associated with hearing loss [4]. The unpredictable, fluctuating nature of Meniere's disease, the lack of an objective diagnostic test, and the high incidence of spontaneous resolution of symptoms make it extremely difficult to come to valid statistical conclusions with regard to therapeutic efficacy in Meniere's disease. The attacks frequently are associated with nausea, vomiting, and diaphoresis. After the attacks, patients usually are fatigued for 24 hours or more. The attacks of vertigo may be associated with a concomitant or preceding change in their hearing loss, tinnitus, or aural fullness. Many patients also have various combinations of dysequilibrium or motion-provoked vertigo between the classic attacks. Subtypes of Meniere's disease are described that have only vestibular symptoms (vestibular Meniere's) or auditory symptoms (cochlear Meniere's). Hypothyroidism is a condition where thyroid hormone is in insufficient quantity is one of the common disorders of endocrine system. Most common cause for hypothyroidism worldwide other than iodine deficiency is autoimmune. Hypothyroidism causes many symptoms and signs like fatigue, lethargy, weight gain, cold intolerance, etc., it also

causes hearing loss, vertigo, tinnitus. Approximately 40% of adults with hypothyroidism have the involvement of sensorineural hearing loss in both ears. Considerable deafness persists after thyroxine therapy in 10% of patients with congenital hypothyroidism [5]. Although it is common in primary hypothyroidism, deafness has been reported with pituitary dysfunction [6].

The present study was undertaken to find out the incidence of hypothyroidism in Menieres disease. A total of 35 patients, clinically diagnosed of Menieres disease over a 6 months period were included in the study. All the patients met the criteria determined by the 1995 American Academy of Otolaryngology for Meniere's disease [1] and were treated only on out patient's basis.

Meniere's disease is critical clinical condition, the medical management of which has shown poor results [7]. All patients who are clinically diagnosed with Meniere's disease were classified as having unilateral or bilateral ears involvement (criteria described by Kitahara [8]). Patients among the study group, who were found to have hypothyroidism were prescribed thyroid hormone supplements as an add-on medication.

AIM

To study the incidence of hypothyroidism in Meniere's disease and the subjective symptom improvement after the treatment.

MATERIALS AND METHODS

The study was carried out on a total of 35 out patients who were clinically diagnosed as Meniere's disease and of these 35 patients, 12 patients were found to have hypothyroidism. All patients with hypothyroidism were treated with oral thyroxin supplements and they were evaluated clinically at 3 weeks, 3 months and at 6 months intervals for the improvement in subjective symptoms on outpatient basis only.

Inclusion criteria

1. All cases of clinically diagnosed Meniere's disease only.
2. Age group 15 years and above irrespective of the sexes.

Exclusion criteria

Patients with diseases like otitis media, otosclerosis, perilymphatic fistula, vestibular neuritis, labyrinthitis, posttraumatic vertigo, or previous ear surgery were excluded. Patients with cerebro vascular accidents, and central nervous system disorders causing vertigo, psychiatric disturbances, seizure disorder, or other otologic diseases, congenital hearing loss, systemic autoimmune disorders and the patients with a history of thyroid surgery or thyroid ablation were also excluded from the study.

The selected patients were subjected to clinical, audiological, and laboratory investigations.

RESULTS

Age distribution: In our study, maximum patients with Meniere's disease who were found to have hypothyroidism, were in the age group of 31-45 years, however, the number of patients between the age group of 15-30 years and more than 45 years of age were found to be equal [Table/Fig-1].

The early presentation may be due to increased awareness to health issues and difficulty affecting the work efficiency, leading patients to seek early medical intervention.

Sex distribution: [Table/Fig-2]-There is female sex predilection for disease in our study out of 12 hypothyroidic patients only one patient was male and the male to female ratio was 0.08: 1.

Side affected: [Table/Fig-3]-In this study Bilateral ear involvement was seen in 9 patients (75%), Right ear involvement was found in 2 patients (16.6%), and only 1 patient (8.4%), had Left ear involvement who was a male.

Duration of symptoms & Sex distribution: [Table/Fig-4]-In our study 6 patients (50%), all females, were having the symptoms of Meniere's disease, duration ranging between between 2 to 4 years of duration and 3 patients (25%) had symptoms for more than 4 years.

Hearing improvement before and after 12 weeks of treatment: [Table/Fig-5]-In our study 6 female patients (50%) had Sensory Neural Hearing Loss duration ranging between 2 to 4 years and 3 female patients (33.4%) had this symptom for more than 4 years only 2 female patients (16.6%) had hearing loss for a period of

Age group in years	Patients with Euthyroidism	%	Patients with Hypo Thyroidism	%
15-30	11	31.4%	3	8.5%
31-45	6	17.4%	6	17.4%
>45	6	17.4%	3	8.5%

[Table/Fig-1]: Age distribution.

Sex	Patients with HypoThyroidism	%
Male	1	8.4%
female	11	91.6%

[Table/Fig-2]: Sex distribution.

Side affected	Patients with HypoThyroidism	%
Right	2	16.6%
Left	1	8.4%
Bilateral	9	75%

[Table/Fig-3]: Side affected.

Duration of symptoms & Sex distribution	Male	%	Female	%
0-2	1	8.3	2	16.6
2-4	0	0	6	50
>4	0	0	3	25

[Table/Fig-4]: Duration of symptoms and sex distribution.

less than 2 years. Only 1 male patient had Sensory Neural Hearing Loss for less than a period of 2 years.

The average Bilateral Sensory Neural Hearing Loss was 40 dB in the involved cases and it was found to be 50dB in patients with only right ear involvement and 40dB in right and left ears. These patient showed significant improvement in hearing after 12 weeks of treatment (p<0.000).

Status of Thyroid Hormone Profile: [Table/Fig-6]-There was classical elevation in the TSH levels in 12 patients who were detected to be hypothyroidic, and reverted to Euthyroidic state after 12weeks of treatment in T3 and TSH levels (p<0.002 and p<0.006 respectively). Whereas the T4 values did not change significantly in our study. In our study, after 12 weeks of the treatment for the hypothyroidism showed significant reduction in the TSH levels which is the sensitive indicator of the hypothyroidism is what we have considered.

However, in our study the T3 and more so the T4 levels reduction was not much appreciable and they were found within the normal range and also deriving that the TSH level is the sensitive indicator for hypothyroidism.

Mean vertigo score (SM): [Table/Fig-7]- The mean vertigo score for rotator sensation, tinnitus, hearing loss and aural fullness was found to be reduced significantly after 12weeks of oral thyroid supplement therapy.

The clinical examination results of the Unterburger Test showed significant improvement after 12weeks of therapy in Angle of Deviation, Angle of Rotation, Lateral sway and in Ant-post displacement and all patient's parameters were in the normal range (p<0.000).

In our study all hypothyroid patients scored 2 with respect to the hearing loss and the sum of scores of all subjects for hearing loss were equal to 24, hence the standard deviation came out to be zero in hearing loss.

In our study, the subjective improvement of all symptoms was seen in all cases of Meniere's disease with hypothyroidism after 12 weeks of treatment.

Side affected	Patients with Hypo Thyroidism	%	Avg Hearing loss Before Treatment	Avg Hearing loss After 12weeks of Treatment
Right	2	16.6%	50dB	45dB
Left	1	8.4%	40dB	30dB
Bilateral	9	75%	40dB	23.4dB

[Table/Fig-5]: Hearing loss before and after 12 weeks of treatment.

Thyroid Functions	Mean	Std Deviation	Willcoxon Signed Ranks Test	p-value	
T3	Before treatment	94.68	31.84	3.06	p<0.002
	After treatment	77.5	10.55		
T4	Before treatment	8.38	4.54	1.42	NS
	After treatment	7.33	1.09		
TSH	Before treatment	25.03	43.87	2.75	p<0.006
	After treatment	2.92	1.00		

[Table/Fig-6]: Status of thyroid hormone profile.

	n=12	Mean	Std Deviation	t-value	p-value
Sense of Rotation	Before	1.42	0.67	3.32	p<0.001
	After	0.5	0.67		
Tinitus	Before	1.5	0.52	3.46	p<0.001
	After	0.5	0.52		
Hearing loss	Before	2	0	2.83	p<0.005
	After	1.33	0.49		
Aural Fullness	Before	1.33	0.49	3.32	p<0.001
	After	0.5	0.69		

[Table/Fig-7]: Mean vertigo score before and after 12 weeks of treatment. N: number of hypothyroid patients, Std: Standard.

The Mean Vertigo Score Improvement for Sense of rotation is 1.42 to 0.5, ($p < 0.001$) Tinnitus from 1.5 to 0.5, ($p < 0.001$) Aural fullness from 1.33 to 0.67, ($p < 0.04$), before and after 12 weeks of treatment, and for the symptom of Hearing loss which improved from 2 to 1.33 after 12 weeks of treatment, ($p < 0.04$) for the hypothyroidism.

DISCUSSION

The exact cause of Meniere's disease remains unknown. However, it is considered to be a multifactorial disease. Several studies done to find the prevalence of hypothyroidism among patients with Meniere's disease and it varied from 3% to 17%. [7-9]. The clinical examination to identify the thyroid dysfunction still remains as the key stone area in spite of the available thyroid function tests [10].

To maintain the uniformity and standard of our study with the studies already done, we selected the patients diagnosed of Meniere's disease with respect to the involvement of the side of the ear and were classified based on the diagnostic criteria described by Kitahara [11], and the 1995 American Academy of Otolaryngology criteria for unilateral Meniere's disease [12].

The components of Meniere disease were fluctuating vertigo, sensorineural hearing loss; tinnitus and aural fullness are the clinical presentation resulting from several different pathologic processes [12].

The association of thyroid dysfunction with age in the studies conducted show varying results, some show higher prevalence of thyroid dysfunction in the elderly population, and other studies show as low as 10% [13-16]. However in our study, 50% patients with hypothyroidism were between 31 to 45 years of age.

The studies have shown that the clinical features of Meniere's disease are produced by the metabolic changes occurring in hypothyroidism [17-20], though other studies did not supported this finding [21-24]. The role of autoimmunity related thyroid disorders is not clear in Meniers disease and is only a susceptible entity and the metabolic changes occurring in hypothyroidism produces the symptoms of Meniers disease [24-34].

Our study did not include the autoimmune thyroid disorders; however some studies support the role autoimmune thyroid dysfunction as a causative factor for some cases of Meniere's disease [30-34].

In our study the incidence of hypothyroidism was found to be high. There should be a high degree of suspicion in clinically examining patients diagnosed with Menieres disease, as there may be no thyroid enlargement on clinical examination as in the present study, which made it possible for the patients with less severe thyroid dysfunction to be diagnosed and treated.

CONCLUSION

Our study shows the possibility of a higher incidence of thyroid dysfunction in patients with Meniere's disease, especially in middle aged patients, Hence clinicians should consider screening for thyroid dysfunction in patients with Meniere's disease who are not already taking supplements. However, further studies with larger sample size is needed.

REFERENCES

- [1] Kitahara M, Matsubara H, Takeda T, Yazawa Y. Bilateral Meniere's disease. *Adv Otorhinolaryngol*. 1979; 25:117-21.

- [2] Gibson WP, Arenberg IK. Pathophysiological theories in the aetiology of Meniere's disease. *Otolaryngol Clin North Am*. 1997; 30(6):961-67.
- [3] Dornhoffer JL, Arenberg JG, Arenberg IK, Shambaugh GE. Pathophysiological mechanisms in immune inner ear disease. *Acta Otolaryngol Suppl*. 1997; 526:306.
- [4] Bhatia PL, Gupta OP, Agrawal MK, Mishr SK. Audiological and vestibular function tests in hypothyroidism. *Laryngoscope*. 1997;87(12):2082-89.
- [5] Debruyne F, Vanderschueren-Lodeweyckx M, Bastinjn P. Hearing in congenital hypothyroidism. *Audiology*. 1983;22:404.
- [6] de Luca F, et al. Sensorineural deafness in congenital hypopituitarism with severe hypothyroidism. *Acta Paediatr Scand*. 1985;74:148.
- [7] Shambaugh GE. Endocrine aspects of Meniere's disease. *The Laryngoscope*. 1959;69:1027-32. doi: 10.1288/0000553719590800000004.
- [8] Pulec L, House WF. Meniere's disease study: three-year progress report *International Journal of Equilibrium Research*. 1973;3(1):156-65.
- [9] Powers WH. Symposium on Meniere's disease. II. Metabolic aspects of Meniere's disease. *The Laryngoscope*. 1972;82:1716-25. doi: 10.1288/0000553719720900000012
- [10] LoPresti JS. Laboratory tests for thyroid disorders. *Otolaryngol Clin North Am*. 1996; 29(4):557-75.
- [11] Kitahara M. Bilateral Aspects of Meniere's disease. Meniere's disease with bilateral fluctuant hearing loss. *Acta Oto Laryngologica*. 1991;485:74-77.
- [12] Rauch SD, San Martin JE, Moscicki RA, Bloch KJ. Serum antibodies against heat shock protein 70 in Meniere's disease. *Am J Otol*. 1995; 16(5):648-52.
- [13] Bagchi N, Brown TR, Parish RF. Thyroid dysfunction in adults over age 55 years a study in an urban us community. *Arch Intern Med*. 1990; 150(4):785-87. doi:10.1001/archinte.1990.00390160053012.
- [14] Rapoport B. Pathophysiology of hashimoto's thyroiditis and hypothyroidism. *Annual Review of Medicine*. 1991;42:91-96.
- [15] Sawin CT, Castelli WP, Hershman JM, McNamara P, Bacharach P. The aging thyroid. Thyroid deficiency in the Framingham Study. *Arch Intern Med*. 1985; 145(8):1386-88.
- [16] Weetman AP, McGregor AM. Autoimmune thyroid disease: further developments in our understanding. *Endocr Rev*. 1994; 15(6):788-830.
- [17] Godlowski ZZ. Hormones related to allergy. *Trans Am Acad Ophthalmol Otolaryngol*. 1958; 62(6):835-61; discussion 8613.
- [18] Godlowski ZZ. Endocrine management of selected cases of allergy based on enzymatic mechanism of sensitization. *AMA Arch Otolaryngol*. 1960; 71:513-57.
- [19] Pulec JL. Symposium on Meniere's disease. I. Meniere's disease: Results of a two and one half year study of aetiology, natural history and results of treatment. *The Laryngoscope*. 1972;82:1703-15. doi: 10.1288/0000553719720900000011.
- [20] Clarke WL, Shaver KA, Bright GM, Rogol AD, Nance WE. Autoimmunity in congenital rubella syndrome. *J Pediatr*. 1984; 104(3):370-73.
- [21] Meyerhoff WL, Paparella MM, Gudbrandsson FK. Clinical evaluation of Meniere's disease. *The Laryngoscope*. 1981;91:1663-68. doi: 10.1288/0000553719811000000012.
- [22] Kinney SE. The metabolic evaluation in Meniere's disease. *Otolaryngol Head Neck Surg*. 1980; 88(5):594-98.
- [23] Austin DF. Use of polytomography in Meniere's disease. *Arch Otolaryngol*. 1980; 106(7):377-82.
- [24] Watanabe I. Ménière's disease in males and females. *Acta Otolaryngol*. 1981; 91(56):511-14.
- [25] Paparella MM, Griebiea MS. Bilaterality of Meniere's disease. *Acta Oto Laryngologica*. 1984;97(3-4).
- [26] Hughes GB, Kinney SE, Barna BP, Calabrese LH. Autoimmune reactivity in Ménière's disease: a preliminary report. *Laryngoscope*. 1983; 93(4):410-17.
- [27] Hughes GB, Barna BP, Kinney SE, Calabrese LH, Nalepa NJ. Clinical diagnosis of immune innerear disease. *Laryngoscope*. 1988; 98(3):251-53.
- [28] Hughes GB, Barna BP, Kinney SE, Calabrese LH, Hamid MA, Nalepa NJ. Autoimmune endolymphatic hydrops: five year review. *Otolaryngol Head Neck Surg*. 1988; 98(3):221-25.
- [29] Suzuki M, Kitahara M. Immunologic abnormality in Ménière's disease. *Otolaryngol Head Neck Surg*. 1992; 107(1):57-62.
- [30] Paparella MM, Djallilian HR. Aetiology, pathophysiology of symptoms, and pathogenesis of Meniere's disease. *Otolaryngol Clin North Am*. 2002; 35(3):529-45.
- [31] McCabe BF. Meniere's disease autoimmune sensorineural hearing loss. *Ann Otol Rhinol Laryngol*. 1979;88(5):585-89.
- [32] Derebery MJ, Berliner KI. Allergy for the otologist. External canal to inner ear. *Otolaryngol Clin North Am*. 1998; 31(1):157-73.
- [33] Harris JP. Experimental autoimmune sensorineural hearing loss. *The Laryngoscope*. 1987;97:63-76. doi: 10.1288/0000553719870100000014.
- [34] Merchant SN, Rauch SD, Nadol JB. Meniere's disease. *Eur Arch Otorhinolaryngol*. 1995;252:63-75.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Oct 29, 2015**
Date of Peer Review: **Jan 06, 2016**
Date of Acceptance: **Mar 04, 2016**
Date of Publishing: **May 01, 2016**