

## Vertigo and Thyroid Disorders: A Correlational Study

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### Abstract

**Background:** Thyroid hormones play a role in the development and functioning of the inner ear. Therefore, it was hypothesised that a derangement in the thyroid hormone levels can affect the cochleo-vestibular system.

**Methods:** The present study included 30 cases BPPV were studied. All the subjects underwent thyroid function tests-serum T3, T4 and thyroid stimulating hormone (TSH) and full Vertigo workup.

**Results:** Out of all 30 cases 14 showed altered Thyroid Profile.

**Conclusions:** There seems to be an association between functional thyroid hormone levels and BPPV. Therefore, altered Thyroid metabolism may have a role in the causation of vestibular dysfunction as in BPPV.

**Keywords:** Thyroid hormones, Vertigo, BPPV.

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### Introduction

Inner ear Vertigo a spectrum in Dizziness has been a common Problem since long . It has been seen that Vertigo has been associated with many systemic diseases including Metabolic diseases.[1]

Many studies show that Thyroid hormones are well documented in development of inner ear and also known to cause maturation of Middle ear and size of ossicles. Thus in this study we wish to correlate thyroid disorders leading to Vertigo or Dizziness specially BPPV.[5]

Hypothyroidism has be suspected as a cause in Meniere's disease but its establishment with other causes of Dizziness is not well authenticated. Though BPPV being the most common cause of Peripheral vertigo has not been related well in any way to thyroid diseases.[1]

Also, it is significant to see that the demographic profile of both the diseases tend to have more propensity to female gender.

### Methods

The present study was done at RUHS College of Medical Sciences from January 2022 to March 2023. A total of 30 cases of BPPV were studied. Each case had a full Vertigo workup done.

Each case went under complete thyroid Profile. Free hormone levels were obtained in patients with subclinical hypo or hyperthyroidism

Diagnosis of BPPV was done as Recurrent attacks of vertigo with duration of attack <1minute along with symptoms provoked by changes of head position like lying down or turning over in the supine position or at least 2 of the following manoeuvres:

reclining the head, rising up from supine position, bending forward, not attributable to any other disorder.

BPPV was diagnosed and treated with appropriate medications and specific Manouvers. PTA and VNG were normal in all patients.

### Results

Out of 30 patients 14 had altered thyroid profile which ranged from mild to moderate and subclinical to clinical.

All the cases had Hypothyroidism.

The results were tabulated as

**Table 1:**

Thyroid Hormone Level	Normal	Altered
<b>T3(0.97-1.69 ng/ml)</b>	22(73%)	8(27%)
<b>T4(5.5-11 mcg/dl)</b>	24(80%)	6(18%)
<b>TSH(0.4-4.6 mIU/l)</b>	16(53%)	14(47%)

Thus, as the above table shows that out of 30 cases 8(27%) cases has low T3 and 6(18%) cases had low T4. But out of 30 cases 14 cases had low TSH which a significant 47% of cases.

### Discussion

The most frequent cause of peripheral vertigo is BPPV amounting to almost 20% of cases. There sudden attacks of vertigo provoked by certain head positions. They may also have vomiting associated with severe attack, postural instability and light-headedness. Otoconia in the semicircular canal which get displaced from the utricle by certain head movements are responsible for the vertigo. It also produces canal-specific nystagmus. Posterior canal is the commonly affected one. Superior canal is least commonly affected due to its vertical placement which does not allow the otoconia to settle in the canal. The two theories of BPPV are canalolithiasis and cupulolithiasis introduced by Schucknecht

(1969) and Hall (1979) respectively. Canalolithiasis implies that otoconia are present in the endolymph of semicircular canal whereas in cupulolithiasis, they are seen adherent to cupula of the canal. Dix–Hallpike is the diagnostic manoeuvre for posterior canal BPPV which is most common affected semicircular canal.[1]

Hearing can get affected in hypothyroidism because of inadequate oxygenation in the organ of Corti and stria vascularis. Defective protein and myelin synthesis, enzymatic dysfunction is also suggested as probable causes.[3]

Thyroid hormones are required for proper functioning and development of the inner ear. Deficiency of thyroid hormones also affects the conduction of nerve impulses along the central vestibular pathway.

Alpha and beta specific receptors related to thyroid hormones seen in the vestibule and cochlea were found to have a role in the Labyrinthine development. Outer hair cells

contractility may be dependent on protein Prestin regulated by thyroid hormones.[5]

### Conclusion

Though a clear association between Thyroid deficiency and BPPV may not be clear as a longer and larger study may be required.

But looking at the above study we can clearly say that Hypothyroidism if not a cause but may be a potentiating factor in BPPV and diagnosing and treating it along with the usual treatment of BPPV may give a better and quicker relief to the patient.

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