

Original Research Article

Otorhinolaryngological manifestations in patients with hypothyroidism: a cross-sectional observational study

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ABSTRACT

Background: Hypothyroidism is a common endocrine disorder that frequently manifests with symptoms affecting the otorhinolaryngological (ENT) system. These symptoms are often under-recognized or misdiagnosed, leading to delayed management. This study aimed to evaluate the prevalence and types of ENT symptoms in patients with hypothyroidism and correlate these findings with thyroid hormone levels.

Methods: A cross-sectional observational study was conducted in a tertiary care centre over 8 months, enrolling 200 adult patients diagnosed with primary hypothyroidism. Detailed ENT history and clinical evaluation were performed. Investigations included thyroid function tests, pure tone audiometry for patients with hearing complaints, and laryngoscopy for those with voice changes. Patients were categorized based on TSH levels into mild (4.5–10 mIU/l), moderate (10–20 mIU/l), and severe (>20 mIU/l) hypothyroidism.

Results: Among 200 participants (mean age: 42.5±12.1 years; 70% female), 72% reported at least one ENT symptom. Hoarseness of voice (46.5%), nasal congestion (39%), and hearing loss (36%) were most common. Audiometry revealed sensorineural hearing loss in 62.9% and conductive loss in 37.1% of symptomatic patients. Laryngoscopic evaluation showed vocal cord edema in 72.3% cases. ENT symptom prevalence increased significantly with higher TSH levels ($p<0.001$).

Conclusions: ENT manifestations are prevalent in hypothyroidism and correlate with disease severity. Early ENT evaluation and thyroid function testing can facilitate timely diagnosis and improve quality of life.

Keywords: Hypothyroidism, ENT, Hearing loss, Hoarseness, Laryngoscopy

INTRODUCTION

Hypothyroidism, a condition characterized by insufficient circulating thyroid hormones, is a widespread metabolic disorder with multifaceted clinical presentations. It affects 4–10% of the general population, with a significantly higher incidence in females.¹ Although the systemic effects of hypothyroidism—such as weight gain, fatigue, and cold intolerance—are well known, its manifestations in the head and neck region are often overlooked. Thyroid hormones are crucial for the metabolic maintenance of epithelial, muscular, and neural tissues in the upper

aerodigestive tract. Deficiency results in mucopolysaccharide deposition and interstitial edema, leading to a variety of ENT symptoms such as hoarseness, nasal obstruction, dysphagia, and hearing loss.^{2,3} Furthermore, cochlear dysfunction, vocal cord thickening, and impaired mucociliary clearance may compound these manifestations. Previous studies have demonstrated that voice changes, particularly hoarseness, are common due to fluid retention in the Reinke's space of the vocal folds.⁴ Similarly, middle ear effusion and Eustachian tube dysfunction contribute to conductive hearing loss, while cochlear involvement is responsible for sensorineural

hearing loss. Nasal symptoms arise from mucosal congestion and impaired muco-ciliary clearance. Despite these well-documented associations, ENT symptoms are seldom prioritized in hypothyroid patients, delaying diagnosis and treatment. Furthermore, few Indian studies have systematically analysed the correlation between thyroid hormone levels and ENT manifestations using objective diagnostic tools. This study aims to bridge that gap by identifying the prevalence and pattern of ENT symptoms in patients with hypothyroidism and analysing their relationship with serum TSH levels. By doing so, we seek to emphasize the need for routine ENT screening in this population for timely intervention.

METHODS

This cross-sectional observational study was conducted at a tertiary care teaching hospital over eight months (July 2024 to February 2025), following approval by the institutional ethics committee. A total of 200 adult patients (≥18 years) diagnosed with primary hypothyroidism (TSH >4.5 mIU/l) were enrolled consecutively from the outpatient departments of ENT and General Medicine. Written informed consent was obtained from all participants. Exclusion criteria included patients with pre-existing ENT diseases unrelated to thyroid dysfunction, history of head and neck surgeries, or known neurological or autoimmune conditions affecting ENT function. Each participant underwent comprehensive clinical evaluation. ENT symptoms were recorded using a structured questionnaire and clinical examination. Patients with auditory complaints underwent pure tone audiometry (PTA). Those with voice complaints were evaluated using indirect laryngoscopy or fiberoptic laryngoscopy. Nasal endoscopy was performed selectively. Thyroid function tests, including TSH, free T3, and free T4, were recorded for all patients. Patients were stratified into three groups based on TSH levels - mild: TSH 4.5–10 mIU/l, moderate: TSH 10–20 mIU/l, and severe: TSH >20 mIU/l.

The prevalence of ENT symptoms was analyzed across these groups. Descriptive statistics were used to calculate frequencies and percentages. Chi-square test was used to evaluate the association between TSH levels and ENT symptoms. A p value <0.05 was considered statistically significant. All data were analyzed using statistical package for the social sciences (SPSS) version 25.

RESULTS

Of the 200 patients enrolled, 140 (70%) were female and 60 (30%) were male. The mean age was 42.5±12.1 years. Among these, 92 patients (46%) were newly diagnosed, and the rest were on thyroid hormone replacement therapy. Out of the total cohort, 144 patients (72%) reported at least one ENT symptom. The most frequently reported symptom was hoarseness of voice, observed in 93 patients (46.5%), followed by nasal congestion in 78 (39%) and hearing loss in 72 (36%) (Table 1). Other symptoms included globus sensation (24%), tinnitus (18.5%), vertigo

(15%), sleep apnoea-like symptoms (14%), and throat dryness (12.5%). Among the 70 patients who underwent audiological evaluation due to hearing-related complaints, 44 (62.9%) had sensorineural hearing loss, 26 (37.1%) had conductive loss, and 8 (11.4%) showed a mixed pattern. Interestingly, 20 (28.6%) of these symptomatic patients had normal hearing on audiometry (Table 2). The association between thyroid hormone status and ENT manifestations was analyzed using TSH levels. Patients with mild hypothyroidism (TSH 4.5–10 mIU/l) had ENT symptoms in 50 of 90 cases (55.5%), those with moderate TSH elevation (10–20 mIU/l) showed 55 of 65 cases (84.6%) with symptoms, and in the severe group (>20 mIU/l), 41 of 45 patients (91.1%) reported ENT symptoms. A chi-square test demonstrated a statistically significant association between TSH level and ENT symptom prevalence ($\chi^2=25.83$, $p<0.001$) (Table 3).

Table 1: Prevalence of ENT symptoms in hypothyroid patients (n=200).

ENT symptom	Number of patients	Percentage (%)
Hoarseness of voice	93	46.5
Nasal congestion	78	39.0
Hearing loss	72	36.0
Globus sensation	48	24.0
Tinnitus	37	18.5
Vertigo	30	15.0
Snoring/sleep apnoea symptoms	28	14.0
Throat discomfort/dryness	25	12.5

Table 2: Audiological evaluation results in symptomatic patients (n=70).

Hearing loss type	Number of patients	Percentage (%)
Sensorineural	44	62.9
Conductive	26	37.1
Mixed	8	11.4
Normal	20	28.6

Table 3: TSH Levels and ENT symptom prevalence (n=200).

TSH range (mIU/l)	No. of patients	With ENT symptoms	Without ENT symptoms
4.5–10 (mild)	90	50 (55.5%)	40 (44.5%)
10–20 (moderate)	65	55 (84.6%)	10 (15.4%)
>20 (severe)	45	41 (91.1%)	4 (8.9%)

Chi-square=25.83, p<0.001

Among 83 patients evaluated with laryngoscopy for hoarseness or throat complaints, 60 (72.3%) had vocal

cord edema, 18 (21.7%) showed thickened cords, while 5 (6%) had no visible abnormalities (Table 4).

Table 4: Laryngoscopy findings in patients with hoarseness (n=83).

Finding	Number of patients	Percentage (%)
Vocal cord edema	60	72.3
Thickened cords	18	21.7
Normal appearance	5	6.0

DISCUSSION

This study highlights the high prevalence and diverse spectrum of otorhinolaryngological manifestations in patients with hypothyroidism. Among 200 patients studied, 72% exhibited at least one ENT symptom, reinforcing the systemic influence of thyroid hormones on head and neck structures. This aligns with existing literature that underlines the role of thyroid dysfunction in ENT pathologies.⁵⁻⁷ The most frequently reported symptom was hoarseness of voice (46.5%), consistent with prior studies by Pradhan et al and Alam et al, who reported prevalence between 40–60%.^{4,5} Voice hoarseness in hypothyroid patient can be related to various causes with most common cause being the accumulation of mucopolysaccharides in the Reinke's space of vocal cords leading to cord edema and decreased vibratory ability of vocal folds. Laryngoscopic findings in our study showed vocal cord edema in 72.3% of cases (Figure 1). Other causes may include neuromuscular incoordination leading to sluggish movement of intrinsic laryngeal muscles. Thyroid hormones regulate protein synthesis and neuromuscular activity of intrinsic laryngeal muscles and their deficiency can lead to sluggish cord movement and altered phonation leading to hoarseness.⁶ Hypothyroidism can also lead to delayed gastric emptying and increase laryngopharyngeal reflux leading to voice hoarseness. Nasal congestion was reported in 39% of the patients with hypothyroidism. The pathophysiology is multifactorial including mucosal edema, reduced mucociliary clearance, and turbinate hypertrophy. One possible explanation is the accumulation of mucopolysaccharide in the interstitial tissues, including nasal mucosa leading to edema, turbinate hypertrophy and disrupts the function of ciliary epithelial cells that can lead to sensation of nasal blockage. Although our study excluded cases with any pre-existing known ENT pathology, nasal endoscopy was done in selected patients with nasal congestion to rule out confounding factors like chronic rhinosinusitis, deviated nasal septum or any nasopharyngeal mass. Allergic rhinitis was ruled out based on proper history. Similar studies have been done in past that showed symptoms of hypothyroidism linked to nasal obstruction.⁷⁻⁹ Hearing loss was present in 36% of the patients with hypothyroidism, and represents one of the more functionally significant and often ignored manifestations. In our study, potential confounding causes of hearing loss were carefully excluded through clinical history and otoscopic

examination. Patients with known chronic otitis media, significant noise exposure, ototoxic drug use, or age-related hearing decline were identified and excluded. Additional history was taken to rule out autoimmune, metabolic, or syndromic causes. Only those without alternative explanations were included for audiological analysis. Audiological evaluation revealed that sensorineural hearing loss (SNHL) was more common (62.9%) than conductive hearing loss (CHL) (37.1%). (Figure 2) The cochlear hair cells are metabolically active and sensitive to hormonal fluctuations, which may explain the SNHL observed in hypothyroid individuals.^{10,11} Middle ear effusion and Eustachian tube dysfunction from mucosal edema contribute to CHL. Notably, some patients (28.6%) had normal PTA findings despite subjective symptoms, indicating that standard audiometry might underestimate early changes or intermittent dysfunction. Another commonly reported symptom was Globus sensation which was present in 24% of cases. Globus sensation in hypothyroid patients was thoroughly evaluated by ruling out confounding factors such as thyroid enlargement, cricopharyngeal dysfunction, and laryngeal lesions through clinical examination, laryngoscopy, and relevant radiological investigations. Psychological factors were also excluded. Thus, the globus sensation was attributed to underlying hypothyroidism.

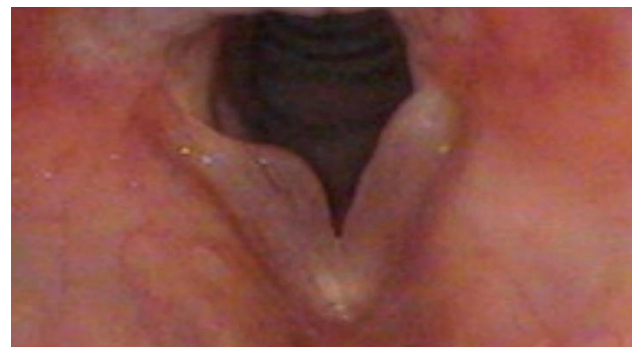


Figure 1: Laryngoscopy showing vocal cord edema in hypothyroid patients.

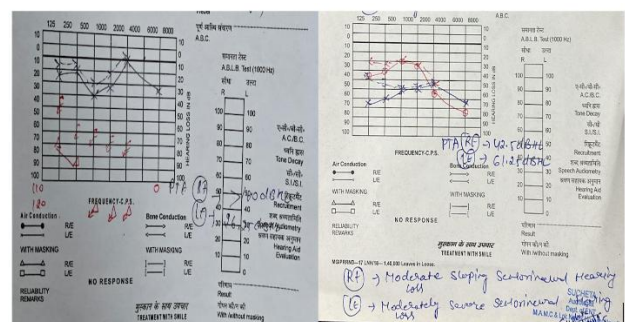


Figure 2: Prevalence of sensorineural hearing loss among hypothyroid patients.

Other symptoms like tinnitus (18.5%), and vertigo (15%) were also commonly reported. These findings are echoed in the works of Nanda et al, who proposed vestibular

dysfunction secondary to altered endolymph dynamics in hypothyroid states.¹² Additionally, sleep-disordered breathing symptoms like snoring were reported in 14% cases. These can be attributed to narrowing of the upper airway from soft tissue hypertrophy, as demonstrated by Lin et al.¹³ Sleep apnoea is increasingly being linked to hypothyroidism, both in obese and non-obese individuals. Our study found a statistically significant correlation between TSH levels and ENT manifestations ($p < 0.001$). Patients with higher TSH levels had a greater frequency of ENT symptoms, supporting a dose-response relationship between hormonal deficiency and symptom burden. Similar trends have been documented by Gupta et al and Kaur et al, who suggested that symptom severity often parallels biochemical abnormalities.^{14,15}

The clinical relevance of these findings is significant. ENT specialists frequently encounter symptoms such as hoarseness, nasal congestion, and hearing impairment. Yet, hypothyroidism is not always suspected, particularly in subclinical or mild cases. This may lead to unnecessary investigations or misdiagnosis. Conversely, endocrinologists may not routinely assess ENT symptoms unless specifically complained about. Our data suggest that a collaborative approach can aid early diagnosis and reduce patient morbidity. Treatment implications are positive. Many of the ENT symptoms related to hypothyroidism are reversible with appropriate levothyroxine therapy. Although our study did not include longitudinal follow-up, other authors have reported symptom improvement within 6–12 weeks of treatment initiation, especially for hearing loss and voice changes.⁹ Early identification can also prevent progression to irreversible complications such as otosclerosis-like pathology or vocal fold atrophy. Limitations of this study include its single-centre design, potential recall bias for subjective symptoms, and lack of longitudinal data to evaluate treatment outcomes. Polysomnography could have provided additional insights but were not feasible for all patients due to resource limitations.

Nevertheless, the strengths include a robust sample size of 200 patients, objective audiometric and laryngoscopic evaluation, and meaningful statistical correlation with TSH levels. This enhances the generalizability of findings, especially in similar Indian healthcare settings. Future directions include prospective studies with treatment follow-up, larger multicentre cohorts, and integration of quality-of-life assessments using validated ENT symptom indices. Genetic predisposition and autoimmune thyroiditis (Hashimoto's) subgroups could also be evaluated for differential ENT involvement.

CONCLUSION

This cross-sectional study confirms that otorhinolaryngological manifestations are common and clinically relevant in patients with hypothyroidism, affecting nearly three-fourths of the study population. Symptoms such as hoarseness, nasal congestion, and

hearing loss dominate the clinical spectrum, with sensorineural hearing loss and vocal cord edema being key findings on objective examination. There exists a statistically significant correlation between the severity of thyroid dysfunction (measured via TSH levels) and the prevalence of ENT symptoms. Recognizing these associations is crucial for both ENT specialists and endocrinologists, as early detection can prompt timely thyroid evaluation and hormone replacement, potentially reversing the symptoms and improving quality of life. Incorporating thyroid screening in patients with persistent ENT complaints, especially in middle-aged women, should be considered a cost-effective diagnostic strategy in outpatient settings.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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