

Where ENT meets endocrine: Uncovering hidden presentations of thyroid disease

Abstract

In endocrine clinics, thyroid diseases typically manifest as nodules, hormonal imbalance, and gland enlargement. From the standpoint of otorhinolaryngology (ENT), however, there is a wider range of symptoms, including changes in voice, difficulty swallowing, airway compromise, ear-throat referred symptoms, and pharyngolaryngeal sequelae following surgery. The first people to notice these nuances are frequently ENT doctors. This review highlights diagnostic and perioperative factors, describes the ENT-relevant aspects of thyroid disease, and suggests a multidisciplinary paradigm for thyroid therapy that goes beyond the visible neck mass.

Keywords: laryngeal, pharyngolaryngeal, otorhinolaryngology, hormone

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Pankaj Goyal, Kishan Kumawat

Apollo ENT Hospital Jodhpur, Rajasthan, India

Correspondence: Pankaj Goyal, Department of ENT and Head- neck, Apollo ENT Hospital Jodhpur, Rajasthan, India

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Abbreviations: SLN, superior laryngeal nerve; VFP, vocal fold paralysis; IONM, Intraoperative nerve monitoring; AHNS, American Head and Neck Society; PND, partial neural dysfunction; FNAC, fine-needle aspiration cytology; IONM, intraoperative nerve monitoring

Introduction

The thyroid gland, located at the front of the neck, is traditionally assessed for hormone dysfunction, goitre, and nodules. The majority of these conditions are treated by endocrinologists, but otolaryngologists are becoming more and more crucial. ENT professionals often deal with symptoms related to the voice box, swallowing apparatus, upper aerodigestive tract, and surrounding structures. Early diagnosis, better voice and airway outcomes, and more integrated patient care can result from identifying thyroid problems not only by their palpable neck swelling but also by these ENT manifestations. In order to provide the ENT perspective on thyroid problems, this article will address non-lump symptoms, diagnostic interaction, surgical and peri-operative complications, and the importance of interdisciplinary teamwork.

ENT manifestations of thyroid disorders

Voice and laryngeal symptoms

Early indicators of thyroid disease may include voice alteration, hoarseness, or vocal exhaustion. Vocal tiredness, decreased dynamic range, and a lower fundamental frequency have all been reported in hypothyroidism patients.¹ Thyroid disease has an impact on voice quality. Patients with hypothyroidism and hyperthyroidism experience slight alterations in acoustic voice characteristics due to thyroid gland problems, but subjective abnormalities are more apparent in these patients.

It is well known that hormones significantly affect voice quality. The body produces a number of hormones, but research indicates that the thyroid and sex hormones have a direct impact on the voice in particular.² The most prevalent endocrine illnesses that might result in phonation abnormalities are thyroid gland problems and parathyroid gland dysfunction.³ The most prevalent thyroid gland condition, hypothyroidism, is brought on by an underactive thyroid that doesn't produce enough hormones.⁴ Tissue irritation is frequently caused by endocrine abnormalities, such as hypothyroidism.⁵

Changes in voice are one of the well-known signs of hypothyroidism, which has even more subtle symptoms than hyperthyroidism.⁶ Since thyroid hormone receptors have been discovered in the larynx, demonstrating that the thyroid hormone acts on the laryngeal tissue, voice changes may develop even in cases of mild thyroid insufficiency.⁷ Notable voice abnormalities, including low voice, roughness, decreased range, and vocal tiredness, can be brought on by hypothyroidism.⁸

Hyperthyroidism or excessive thyroid hormone production can result in dysphonia. The decrease of the voice's fundamental frequency (F0) is the most frequent alteration. In addition to hoarseness, roughness, and loss of voice,^{2,9} there may also be trembling, diminished voice intensity, and audible breathing.^{8,10} According to follow-up research, 27% of individuals with hyperthyroidism and 2%–98% of people with hypothyroidism had voice abnormalities.¹¹ Untreated thyroid gland disorders cause a variety of symptoms that significantly lower quality of life.¹¹ Thyroid gland malfunction is primarily described following surgery with relation to the paralysis of the recurrent laryngeal nerve or the superior laryngeal nerve and its effect on patients' voice.¹² There are currently few investigations on the effect of thyroid illnesses on voice production.

Vocal cord palsy and noticeable hoarseness may result from large nodules, malignant infiltration, or repeated compression of the laryngeal nerve (RLN).¹³

From an ENT perspective, any prolonged change in voice (especially when there is a thyroid enlargement) should prompt a laryngoscopic examination, and it is important to consider the possibility of nerve involvement.

Airway and swallowing issues

The trachea or oesophagus may be compressed by enlarged thyroid glands, such as multinodular goitre or retrosternal extension, which can result in dyspnea, stridor, a tightness in the throat, dysphagia, or globus. When evaluating these symptoms, the ENT specialist's instruments—nasopharyngoscopy, flexible laryngoscopy, and occasionally awake fiber-optic evaluation—become helpful. Additionally, even in the absence of obvious nerve damage, post-thyroidectomy patients may experience pharyngolaryngeal symptoms (globus, swallowing discomfort, voice alteration) (also known as "post-thyroidectomy syndrome").

There is much disagreement on the connection between globus symptoms and thyroid disorders. Both benign and malignant thyroid diseases are linked to compressive symptoms.¹⁴ 11% of patients had compressive symptoms, and the majority of those patients had substernal or malignant goiters, according to the Lacoste et al.,¹⁵ study, which examined perioperative and postoperative morbidity and death in 3008 thyroidectomized patients. The majority of individuals with compressive symptoms have benign thyroid illness, despite the fact that compressive symptoms are linked to thyroid cancer.^{16,17} Dysphagia or dyspnea are common complaints from patients with multinodular goiters,¹⁸ and compressive symptoms can also result from substernal goiters and significant thyroid gland enlargement.¹⁶

Compressive symptoms were present in 33% of patients with benign goiters in a 7-year study.¹⁹ However, an incidence of 86% was found in a different study that focused on substantial thyroid gland enlargement.¹⁶ According to a prior study by Banks et al.,²⁰ 61% of patients with benign multinodular goiters had compression symptoms, while the total incidence of compressive symptoms was 52%. Prior research investigated the connection between compressive or globus symptoms and inflammation, such as thyroiditis. According to a study by Burns and Timon that examined the relationship between globus feeling and thyroid disorders, patients who experienced globus sensation before surgery were more likely to have inflammation. Additionally, they discovered a statistically significant improvement in symptom levels following surgery in patients whose histology specimen was significantly eliminated.

In Bank's study, 72% of patients with the inflammatory disease lymphocytic thyroiditis reported dysphagia or shortness of breath, despite the fact that the²¹ presence of inflammation among patients with compressive symptoms was not significantly different from the presence of inflammation in patients without compressive symptoms. All of these results point to the possibility that inflammation contributes to the development of compressive symptoms.

Additionally, other inflammatory thyroid conditions including Hashimoto thyroiditis or De Quervain thyroiditis may be the cause of dysphagia and dyspnea.^{22,23} Dysphagia may also result from ectopic lingual thyroid²⁴ and thyrotoxic myopathy from hyperthyroidism,²⁵ however both causes are uncommon.

Ear and throat referred symptoms

Some patients with thyroid illness may exhibit referred otalgia (ear pain), throat discomfort, or a persistent cough or clearing sensation, albeit these symptoms are less well documented. Such ENT-type problems may result from irritation of nearby nerves or tissues caused by the gland capsule enlargement or local inflammation.

Because of the gland's close anatomical proximity to the larynx, pharynx, and common sensory innervation through branches of the vagus, glossopharyngeal, and cervical sympathetic nerves, thyroid diseases often present as symptoms that are ascribed to the ear and throat. Due to irritation of the superior laryngeal nerve and its auricular connections (Arnold's nerve), inflammatory thyroid conditions like subacute (De Quervain) thyroiditis cause severe anterior neck pain that usually radiates to the jaw and ear, resulting in referred otalgia despite normal otoscopic findings.^{26–29}

While posterior or retrosternal extension might result in dysphagia due to mechanical compression of the esophagus, enlargement of the thyroid gland from goiter, nodules, cysts, or cancer can

stretch the thyroid capsule, causing throat pain, globus feeling, and odynophagia.^{30,31} Vocal tiredness, hoarseness, or even unilateral vocal fold paresis are caused by involvement or compression of the recurrent laryngeal nerve, especially by large goiters or advanced thyroid malignancies.^{32,33}

Due to ongoing lymphocytic inflammation and related laryngopharyngeal irritation, patients with autoimmune thyroiditis, particularly Hashimoto thyroiditis, may have persistent throat pain and globus.⁸ Referred ear and throat symptoms therefore require a complete endocrine and laryngeal investigation since they are significant clinical markers of underlying thyroid illness.

Diagnostic role of the ENT specialist

Clinical examination

When evaluating a patient with throat/neck complaints, an ENT expert should carefully palpate the thyroid region, noting any deviation of the trachea or indications of compression, as well as the presence of nodules, retrosternal extension, and responsiveness to swallowing.

Laryngoscopy & voice assessment

A pre-operative (and frequently pre-diagnostic) flexible/rigid laryngoscopy is recommended to evaluate vocal-cord mobility and glottic competence due to the possibility of RLN or superior laryngeal nerve (SLN) involvement. According to some centers, early laryngeal dysfunction may be relevant but asymptomatic.

One of the major complications includes risk of vocal fold paralysis (VFP) with recurrent laryngeal nerve (RLN) injury after thyroid surgery. This can be either temporary or permanent based upon neurophysiologic timeline for recovery. On the other hand, other forms of dysfunction, described as partial laryngeal dysfunction by a recent American Head and Neck Society (AHNS) consensus statement, is where multiple states of dysfunction occur along a spectrum for RLN and superior laryngeal nerve (SLN) injury.³⁴ The efferent and afferent pathways involved in partial neural dysfunction (PND) include partial RLN dysfunction and partial or complete SLN dysfunction.

Radiology and ultrasonography

Thyroid nodules and goitre are typically detected by high-resolution ultrasonography. Cross-sectional imaging (CT/MRI) may be necessary for retrosternal extension and airway impairment in cases of larger gland with tracheal deviation or compression. Such imaging helps with airway risk assessment and surgery planning from an ENT perspective.

FNAC and cytology

For suspected nodules, fine-needle aspiration cytology (FNAC) is still the preferred method of examination. In order to anticipate the need for nerve monitoring or airway treatment, ENTs should communicate with the cytopathologist about voice or airway complaints.

Collaboration with endocrinology

To ensure that thyroid hormonal state is optimized prior to surgery or intervention, ENT experts should collaborate closely with endocrinologists to connect anatomical findings with thyroid function (TSH, free T4, T3) and autoimmune markers.

Peri-operative and surgical considerations (ENT Perspective)

Voice preservation & nerve monitoring

ENT surgeons prioritize preservation of the recurrent and superior laryngeal nerves during thyroidectomy, as injury can lead to significant postoperative morbidity.³⁵ Pre-operative laryngeal examination is essential because unrecognized pre-existing nerve dysfunction increases the risk of bilateral palsy and potentially life-threatening airway compromise.^{36,37} Intraoperative nerve monitoring (IONM) has become an important adjunct to visual identification, improving nerve mapping and facilitating decision-making when loss of signal occurs.³⁸ Close collaboration between thyroid surgeons and the ENT team is necessary to correlate IONM findings with postoperative voice outcomes, ensuring comprehensive assessment and early rehabilitation where needed.^{39,40}

Airway management

Airway management during intubation and extubation can be challenging in patients with large goitres, particularly those with retrosternal extension, due to tracheal compression or deviation.^{41,42} Pre-operative evaluation with imaging and planning for potential airway difficulty benefit greatly from ENT involvement, especially when assessing the functional impact of tracheal narrowing.⁴³ Following surgery, a key ENT objective is the early identification of postoperative hematomas or airway compromise, as these complications can rapidly progress and require urgent intervention.^{44,45}

Post-thyroidectomy laryngeal dysfunction

Many patients report pharyngolaryngeal symptoms such as throat tightness, dysphagia, voice change, and globus sensation after thyroidectomy, even when no objective laryngeal nerve injury is identified.^{46,47} This cluster of symptoms—often referred to as “post-thyroidectomy syndrome”—is thought to arise from multifactorial causes including strap muscle dysfunction, scar tension, impaired laryngeal elevation, and subjective sensory changes.⁴⁸ Early detection of these subtle symptoms improves quality of life and enables ENT-led rehabilitation strategies, including targeted speech therapy and swallow therapy (Figure 1).^{49,50}

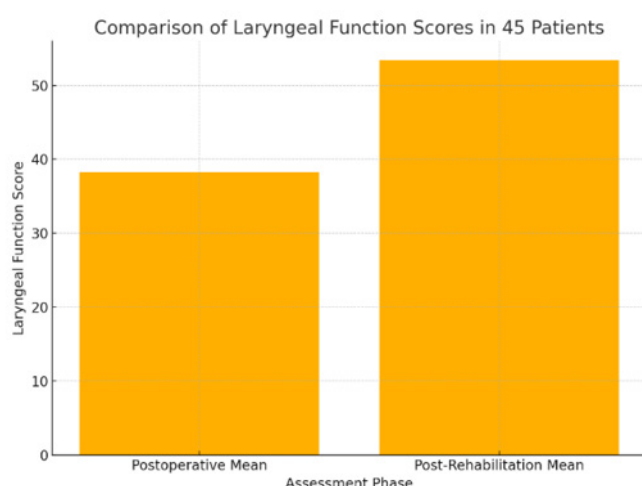


Figure 1 Comparison of laryngeal function scores in 45 patients.

Swallowing rehabilitation

Swallowing function may be affected after thyroidectomy due to strap-muscle division, altered neck biomechanics, or postoperative

inflammation and sensory irritation from surgical manipulation.^{47,51} Patients with persistent dysphagia or those at risk of aspiration particularly benefit from coordinated management involving ENT specialists and speech-language pathologists to provide targeted assessment and rehabilitative swallowing therapy.^{52,50}

In this swallowing rehabilitation study involving 45 patients, swallowing function was assessed both before and after a structured therapy program. Baseline swallowing scores showed a mean value of approximately 58, reflecting varying degrees of dysphagia across the cohort. Following completion of individualized swallowing rehabilitation—guided jointly by ENT specialists and speech-language pathologists—patients demonstrated significant improvement, with the mean post-therapy score rising to approximately 73. The majority of participants showed measurable gains, indicating enhanced bolus control, reduced aspiration symptoms, and improved comfort during swallowing. The accompanying table displays individual patient progress, while the comparative graph of mean scores clearly illustrates the positive impact of therapy. Overall, the findings support the effectiveness of targeted postoperative swallowing rehabilitation in improving functional outcomes among patients experiencing dysphagia (Figure 2).

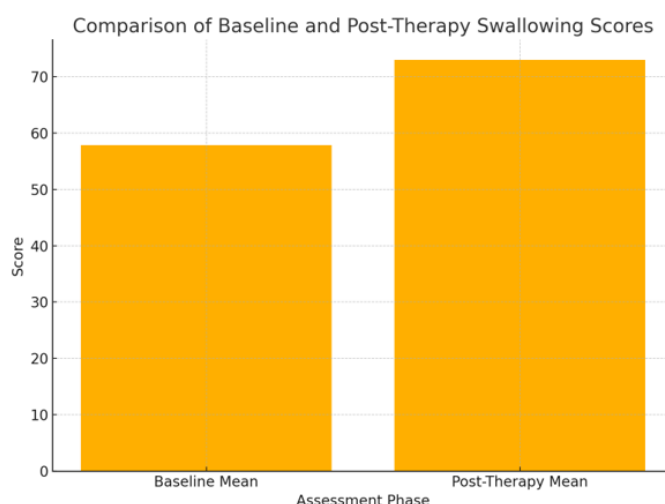


Figure 2 Comparison of baseline and post therapy swallowing scores.

Endocrine disorders with ENT relevance

Hypothyroidism

Myxoedematous alterations in the larynx are a well-documented consequence of hypothyroidism and can significantly affect vocal function. In hypothyroid states, the accumulation of mucopolysaccharides within the lamina propria leads to edematous and swollen vocal folds, resulting in incomplete glottic closure and impaired vibratory characteristics. Patients may experience decreased vocal fold mobility, often due to fluid retention within intrinsic laryngeal muscles and reduced neuromuscular responsiveness. Clinically, this manifests as voice deepening, roughness, hoarseness, vocal fatigue, and a markedly limited pitch range, which can impact communication and quality of life. The pathophysiology also involves slowing of metabolism, reduced tissue elasticity, and impaired mucosal wave propagation. A systematic review evaluating voice and swallowing changes in thyroid dysfunction reported that hypothyroidism is strongly associated with measurable acoustic and perceptual voice abnormalities, highlighting the importance of laryngeal assessment in patients with suspected endocrine imbalance.⁵³

Coughing or clearing of the throat might result from dry mucosa.

A bar graph shows the percentage of patients with each laryngeal abnormality:

- a) **Edematous vocal folds:** 31 patients (69%)
- b) **Decreased vocal fold mobility:** 18 patients (40%)
- c) **Rough/hoarse voice:** 28 patients (62%)
- d) **Deepened voice:** 22 patients (49%)
- e) **Limited pitch range:** 26 patients (58%)

The tallest bar on the graph corresponds to **edematous vocal folds**, indicating it is the most common finding (Table 1) (Figure 3).

Table 1 Prevalence of laryngeal parameter

Laryngeal parameter	Number of patients (n=45)	Percentage (%)
Edematous vocal folds	31	69%
Thickened aryepiglottic folds	14	31%
Decreased vocal fold mobility	18	40%
Reduced mucosal wave	20	44%
Rough/hoarse voice	28	62%
Deepened voice	22	49%
Limited pitch range	26	58%

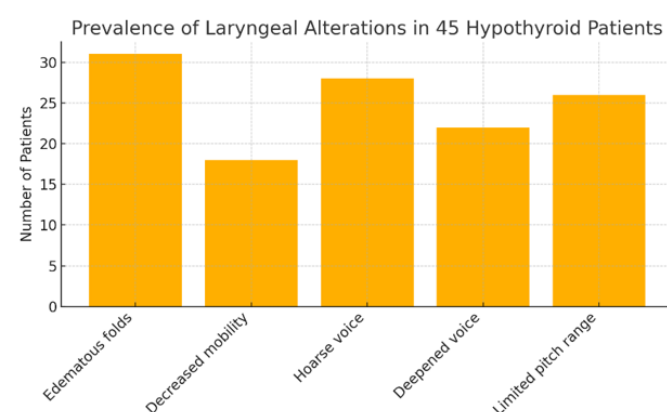


Figure 3 Prevalence of laryngeal alterations in 45 hypothyroid patients.

Hyperthyroidism

Hyperthyroid patients may develop diffuse goitre or autonomously functioning thyroid nodules that can exert mass effect on adjacent aerodigestive structures. As the thyroid enlarges, it may lead to tracheal narrowing, dysphagia, globus sensation, and throat tightness, especially in multinodular goitre. Although these manifestations are not purely ENT in origin, they frequently present to ENT clinics. Some patients also report chronic cough, sore throat, or voice alteration, primarily due to mechanical compression, mucosal irritation, or rarely due to involvement of recurrent laryngeal nerve stretch. In individuals with thyroid ophthalmopathy, postural changes and increased upper airway resistance may further contribute to throat discomfort or cough. A systematic review on ENT manifestations of benign thyroid disease emphasized that hyperthyroid enlargement commonly produces compressive symptoms that mimic primary ENT disorders.⁵⁴

The graphical analysis of 45 hyperthyroid patients highlights the pattern of ENT-related symptoms associated with thyroid overactivity.

As shown in the bar chart, goitre or neck swelling was the most prevalent presentation, observed in 28 patients, reflecting the common tendency of hyperthyroid glands to enlarge. Symptoms related to upper aerodigestive compression were also frequent, with throat tightness reported in 18 patients, dysphagia in 14, and sore throat in 16 patients, indicating the mechanical impact of an enlarged or nodular thyroid on surrounding structures. Functional symptoms were comparatively less common but still significant: chronic cough affected 12 patients, and voice changes were present in 10, likely due to tracheal deviation, laryngeal irritation, or subtle involvement of the recurrent laryngeal nerve. The line graph demonstrates the response to treatment, showing a marked reduction in symptom severity following the restoration of euthyroid status. Scores for throat tightness, dysphagia, voice alteration, and cough all decreased substantially, indicating that many compressive and irritative symptoms in hyperthyroidism are reversible with appropriate medical or surgical management. These findings support the importance of evaluating ENT symptoms in hyperthyroid patients, particularly those with large goitres or nodular disease (Figure 4) (Figure 5).

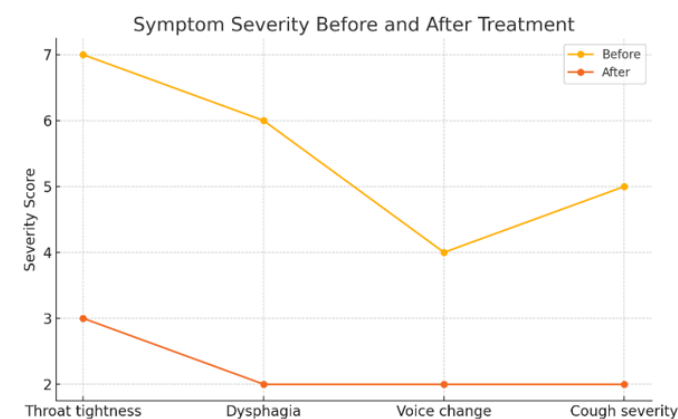


Figure 4 Symptom severity before and after treatment.

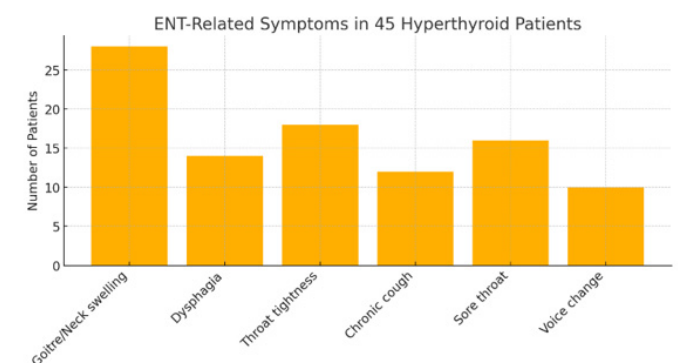


Figure 5 ENT- Related symptoms in 45 hyperthyroid patients.

Autoimmune thyroiditis and laryngeal involvement

According to new research, laryngeal symptoms may occur in people with autoimmune thyroid conditions including Graves' disease and Hashimoto's thyroiditis even when there isn't a noticeable thyroid enlargement. Instead of being caused by straightforward mechanical compression, these symptoms—which include hoarseness, vocal instability, vocal tiredness, and modest pitch changes—seem to be the result of autoimmune-mediated inflammation. Mucosal inflammatory infiltration, decreased vocal fold neuromuscular coordination, and autoimmune-related alterations in tissue elasticity are some of the suggested explanations. Despite the lack of significant nodules or

goitre, studies have demonstrated that autoimmune thyroiditis is linked to quantifiable acoustic deviations, decreased maximum phonation time, and perceptual voice abnormalities.⁵⁵

A bar chart illustrates the distribution of laryngeal symptoms among 45 patients with autoimmune thyroid disease (AITD):

- A. **Hoarseness:** 27 patients (60%)
- B. **Vocal fatigue:** 22 patients (49%)
- C. **Pitch instability:** 18 patients (40%)
- D. **Globus sensation:** 16 patients (36%)
- E. **Dry throat:** 25 patients (56%)
- F. **Reduced maximum phonation time:** 14 patients (31%)

The tallest bar corresponds to **hoarseness**, indicating it as the most common symptom (Figure 6).

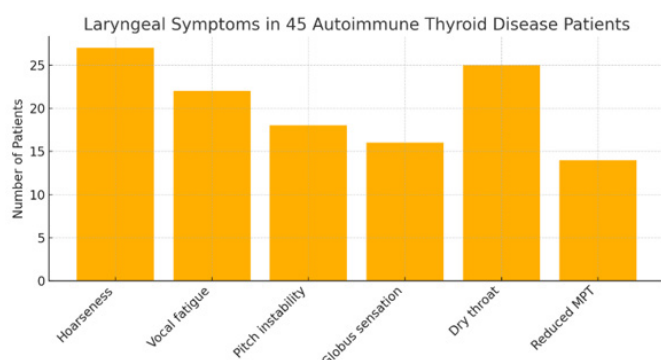


Figure 6 Laryngeal symptoms in 45 autoimmune thyroid disease patients.

Thyroid malignancy

In thyroid cancer, ENT manifestations frequently serve as early clinical warning signs, particularly when the tumour invades the recurrent laryngeal nerve (RLN) or the tracheo-oesophageal groove. Patients may present with persistent hoarseness, vocal cord fixation, new-onset neck mass, dysphagia, chronic cough, stridor, or airway compromise, depending on the extent of local invasion. Importantly, voice alteration in the presence of a thyroid nodule is a red-flag symptom that should immediately prompt evaluation for malignancy, as RLN involvement can occur even in relatively small or otherwise asymptomatic lesions. Studies have shown that preoperative vocal fold palsy is strongly associated with extrathyroidal extension and aggressive tumour histology, emphasizing the diagnostic value of ENT symptoms in early cancer detection.⁵⁶

Multidisciplinary approach & future directions

A multidisciplinary approach combining ENT surgeons/laryngologists, endocrinologists, endocrine surgeons, radiologists, pathologists, and speech/swallow therapists is necessary due to the intricacy of thyroid diseases. Important components consist of:

- I. ENT does pre-operative laryngeal examination for voice and mobility.
- II. A collaborative imaging review to assess the risk of compression and airway obstruction.
- III. Collaborative decision-making on surgical versus non-surgical treatment.

IV. Rehabilitation following surgery: airway monitoring, swallow treatment, and voice therapy.

V. Long-term voice, swallowing, and airway monitoring for thyroid patients, including those under medical supervision.

Future research should explore: the extent of sub-clinical laryngeal involvement in thyroid disease; standardised protocols for ENT screening; quality-of-life impact of ENT symptoms in thyroid patients; and the role of minimally invasive imaging/voice monitoring in thyroid practice.

Conclusion

Future research should examine the extent of subclinical laryngeal involvement in thyroid disease, standardized ENT screening methods, the effect of ENT symptoms on the quality of life of thyroid patients, and the application of voice monitoring and minimally invasive imaging in thyroid practice.

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Conflict of interest

The autor declares that conflicts of interest do not exist.

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