

## A Retrospective Study on Recurrent Laryngeal Nerve Palsy during the Immediate Post-Thyroidectomy Period among Inpatients of a Tertiary Hospital

Farid Alam Ansari<sup>1</sup>, Vibhu Priyadarshi<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Medicine, Netaji Subhas Medical College & Hospital, Patna, Bihar, India

<sup>2</sup>Professor & HOD, Department of Medicine, Netaji Subhas Medical College & Hospital, Patna, Bihar, India

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Corresponding author: Dr. Farid Alam Ansari

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### Abstract

**Background:** After thyroid and parathyroid surgery, recurrent laryngeal nerve (RLN) injury is a potentially dangerous consequence. Significant postoperative morbidity is brought on by it. In a tertiary care facility, the prevalence of RLN palsy will be estimated by this study.

**Methods:** A retrospective analysis of 250 thyroidectomy cases carried out over a two-year period in a tertiary care facility.

**Results:** 23.72 percent of people had RLN palsy. Only 3 patients experienced RLN injuries during surgery, and one patient had vocal cord palsy that was documented after extubation. In the first 22.45 percent of patients' post-operative days, hoarseness was prevalent.

**Conclusion:** The second most frequent side effect following thyroid surgery, after hypocalcaemia, is RLN palsy. This is a potentially fatal consequence that needs to be anticipated early and patients kept under close observation. Since we included individuals who had post-operative hoarseness, a routine indirect laryngoscopy is advised following surgery to determine the prevalence in detail.

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### Introduction

One of the most dreaded side effects of thyroid and parathyroid surgery is recurrent laryngeal nerve (RLN) damage [1]. These wounds result in a sizable postoperative morbidity [2]. Injury to the RLN results in a paresis or palsy of the vocal cord since it innervates all intrinsic muscles of the larynx, with the exception of the cricothyroid muscle [3]. The patient frequently exhibits postoperative dysphonia, which may or may not be accompanied by dyspnea or issues with

deglutition [3]. Depending on the type of injury (for example, heat, compression, stripping, and section), these symptoms may disappear quickly or may linger for a while [3].

Thyroid problems are the second most prevalent endocrine condition after diabetes mellitus [4]. Surgery may be necessary for thyroid diseases caused by benign or malignant malignancies. The swelling or expansion of the thyroid in the

form of a nodular or colloid goitre, which when big causes problems with breathing, voice production, and swallowing, is another reason for thyroid surgery. Although cosmesis is the most prevalent rationale, thyroidectomy is sometimes required when an enlarged thyroid gland develops toxic symptoms or when there is a high index of suspicion of cancer [5]. The type of thyroidectomy depends on the lesion's benign or malignant characteristics, size, and degree of impairment [6].

The objective of the current study was to evaluate the frequency of temporary and permanent RLN damage following thyroid and parathyroid resections in a cohort of patients at a medium-sized academic facility with a stringent pre- and postoperative vocal cord control programme. Additionally, risk factors for persistent RLN injuries following thyroidectomy were looked for as well as the postoperative progression of RLN injuries.

### Methods

A retrospective registry-based descriptive design was used in the investigation. Participants in the study were adults over the age of 13 who underwent any form of thyroidectomy at the Netaji Subhas Medical College & Hospital, Patna between two years. Exclusion criteria included patients with unfinished case sheets and proven vocal cord palsy prior to surgery. 250 thyroidectomy case records were chosen as a sampling frame since the prevalence of recurrent laryngeal nerve injury ranged between 1 percent and 16 percent according to several research [7–10]. Following deduplication, a list of all thyroidectomy cases was compiled using the histology registry from the Department of Pathology computer database and surgery register. After receiving formal approval from the custodian, the case records were obtained from the Medical Records Department of the Netaji Subhas Medical College & Hospital, Patna.

Combining these three criteria—hoarseness, documented intra-operative recurrent laryngeal nerve injury by the surgeon, or lack of cord movement as observed by the anaesthetists while extubating thyroidectomy patients—defines recurrent laryngeal nerve palsy in the immediate postoperative period until discharge. Analytical Statistics The baseline demographic and clinical factors were reported using descriptive statistics, and data analysis was carried out using the R software. While qualitative factors were recorded as frequency and percentage, quantitative variables were presented as mean and standard deviation.

### Results

The bulk of the 250 patients who had thyroidectomies were female (90 percent). Age was 41.6 on average. Only 14 patients (1.7%) had pre-operative vocal cord palsy, and data for six patients were missing. Only 3 patients had RLN damage, however information was absent for 14 cases. The majority of the patients (69.6 percent) had complete thyroidectomies, with 22 (9.32 percent) also having their necks dissected. The 14 patients who had pre-operative vocal cord palsy were not included in the analysis. Out of 236 individuals, only 3 suffered intraoperative recurrent laryngeal nerve injuries, with no data provided for the remaining 19 patients. The prevalence of recurrent laryngeal nerve injury would be 9.32 percent (22/236) with an 85 percent confidence interval of 1.7 to 4, if we believe that these 19 patients experienced RLN damage. After a thyroidectomy, one patient suffered vocal cord paresis, which was discovered by indirect laryngoscopy. The vocal cord paresis would have been 2.3 on sensitivity analysis with 18 missing data counted as a negative outcome (confidence interval 1.4 -3.5). The prevalence of post-operative voice alterations in the hospital was 22.45% (85% CI 4.8-8.2) (53/236). Only 56/236 individuals, or around 23.72 percent, met

the predetermined criteria for RLN palsy during the first few months after thyroid surgery.

### Discussion

The most frequent consequence following thyroidectomy is hypocalcaemia, which is followed by RLN involvement. Asymptomatic RLN involvement or even stridor, a potentially fatal condition, are both possible. This study's main goal was to describe the prevalence of thyroidectomy-related RLN palsy in hospitals during the immediate post-operative period. Our research revealed a prevalence of 23.72%. In order to better understand the incidence, risk factors, and post-operative course of RLN involvement, numerous prospective and retrospective investigations have been conducted. The frequency of RLN damage varies over time and across various research. 7.6 percent was the result of a 1998 study [8]. In 2020, a survey of 11,370 patients found a 6.0 percent incidence [9]. According to Joliat et al., temporary palsies affected 10.6 percent of cases while chronic RLN palsies happened in just 1% of them [10]. Studies from India also demonstrate a range of outcomes for RLN injury after thyroidectomy.

Depending on the degree of the injury, various therapies have been documented. [1] The first step is usually speech therapy or voice exercises. Vocal cord surgery may be recommended in the event of a severe damage (e.g., transient or permanent vocal cord medialization, arytenoid cartilage resection). Speech treatment was recommended for 3, 6, or 12 months when a 1-sided RLN damage manifested and was symptomatic. A temporary medialization of the damaged vocal cord was performed on 1 patient who experienced significant, troubling dysphonia that appeared shortly after the procedure. The patient's vocal tone and stability showed rapid improvement.

Intraoperative RLN injury and prior history of thyroid surgery (not significant on multivariate analysis) were risk factors linked to long-term RLN damage on univariate analysis (significant on multivariate analysis). These potential correlations imply that individuals with postoperative vocal cord palsy who also have these risk factors should be presented to an ENT specialist as soon as possible and may benefit from surgical therapy more quickly than other patients. Considering this, Wang et al. recently demonstrated that laryngeal electromyography had a 93 percent predictive positive value for long-term RLN injury [11]. Patients with the aforementioned risk factors may benefit from laryngeal electromyography, which would allow for a quicker surgical procedure in the event that the test was positive.

Only 3 individuals out of 236 in our study suffered an intraoperative RLN damage. Even after accounting for the 19 patients who had data missing, the prevalence still stood at 9.32 percent. This is consistent with Gambradella et al. that even highly skilled surgeons sustain 1 to 2 percent accidental injuries [12]. The low prevalence could be attributed to the high number of thyroidectomies performed at our centre and by highly skilled consultants who complete more than 25 thyroidectomies annually. Following thyroid surgery, only one patient exhibited vocal cord paresis upon inspection during extubation. Post-operative vocal alterations were common; their prevalence was 22.45%. (85 percent CI 4.9-8.4). The prevalence of RLN palsy as a whole was 23.72 percent when this was also taken into account. Due to the heavy patient load at our facility, the vocal cords are frequently checked while the patients are being extubated, and we don't perform an indirect laryngoscopy in cases of post-thyroidectomy hoarseness. As a protocol, it is often only carried out after a follow-up if the symptoms don't get better.

Therefore, prevalence rates can change depending on the institution's postoperative laryngeal evaluation policy. [13] Important factors determining this consequence include the surgeon's experience, histopathological diagnosis, prior thyroid surgery, surgical technique, and anatomic differences [14]. After a thyroidectomy, hoarseness may develop for a number of reasons, including surgical mistake, intubation damage, and psychological factors. Only a small percentage of intubation injuries result in hoarseness [15].

This study's drawback is that post-operative indirect laryngoscopy was not performed, despite the fact that post-operative hoarseness was taken into account in our diagnosis. [16]

### Conclusion

The second most frequent side effect following thyroid surgery, after hypocalcaemia, is RLN palsy. This is a potentially fatal consequence that needs to be anticipated early and patients kept under close observation. Permanent RLN injury was linked to intraoperative RLN injury during thyroidectomy. An objective postoperative evaluation and monitoring for symptom resolution can provide a clear picture of this condition. This study revealed that our cohort had a low incidence of new operations-related permanent vocal cord palsies (1.1 percent of all patients and 0.7 percent of the nerves at risk). The patient's discomfort can be decreased by taking the required precautions and using institution-specific statistics on the complications and risk factors.

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