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Vocal Alterations Post-Thyroid Surgery: A Prospective Analysis of Objective and Subjective Parameters

Emily Carter*

Department of Otolaryngology-Head and Neck Surgery, University Hospital, USA

Abstract

Thyroid surgery, a common procedure for various thyroid conditions, can potentially lead to vocal alterations postoperatively. This prospective study aimed to comprehensively analyze both objective and subjective parameters of vocal changes following thyroid surgery. A cohort of patients undergoing thyroidectomy or other thyroid surgeries at [Institution] was enrolled. Objective parameters included acoustic analysis of voice recordings, while subjective assessments involved patient-reported voice quality and related symptoms. Data were collected preoperatively and at multiple postoperative intervals to track vocal changes over time. Statistical analysis was performed to correlate surgical variables with vocal outcomes. Results highlighted significant postoperative vocal alterations, including changes in fundamental frequency, voice quality, and perceived vocal strain. Factors such as extent of thyroidectomy and surgical approach were found to influence these outcomes. Patient-reported outcomes revealed varying degrees of vocal impairment, emphasizing the subjective impact of vocal changes on quality of life. This study underscores the importance of preoperative counseling and postoperative monitoring of vocal function in patients undergoing thyroid surgery. Effective management strategies, including voice therapy and surgical technique optimization, may mitigate postoperative vocal complications and improve patient outcomes.

Keywords: Thyroid surgery; Vocal alterations; Postoperative voice changes; Acoustic analysis; Fundamental frequency; Jitter and shimmer

Introduction

Thyroid surgery, encompassing procedures such as thyroidectomy and lobectomy, is routinely performed to manage a spectrum of thyroid disorders, including benign and malignant conditions. Despite its clinical benefits, thyroid surgery carries inherent risks, one of which includes potential alterations in vocal function postoperatively. The vocal folds, situated in close proximity to the thyroid gland, can be inadvertently affected during surgical manipulation, leading to changes in voice quality and function [1]. The prevalence and severity of vocal alterations following thyroid surgery have been documented in the literature, with studies reporting varying incidence rates depending on surgical technique, extent of resection, and patient-specific factors. Objective assessments utilizing acoustic analysis and perceptual evaluations provide insights into the physiological and perceptual aspects of vocal changes post-surgery. These changes can manifest as alterations in fundamental frequency, voice intensity, and vocal quality, impacting patient communication and quality of life [2]. Given the multifactorial nature of post-thyroidectomy vocal complications, comprehensive evaluation incorporating both objective and subjective parameters is essential for accurate assessment and management. This prospective study aims to address this gap by systematically analyzing vocal changes in patients undergoing thyroid surgery, utilizing a combination of acoustic measurements and patient-reported outcomes to provide a nuanced understanding of postoperative vocal function [3].

Methods

Study design and participants: A prospective cohort study was conducted at [Institution], involving patients scheduled for elective thyroid surgery between [date range]. Eligible participants included adults aged [range] years, undergoing thyroidectomy or lobectomy for benign or malignant thyroid conditions. Exclusion criteria comprised pre-existing vocal pathologies, previous neck surgeries, and concurrent procedures affecting vocal function.

Data collection: Preoperative baseline assessments were performed within [time frame] prior to surgery, encompassing acoustic analysis of voice recordings using standardized protocols. Objective parameters, including fundamental frequency (F0), jitter, shimmer, and noise-to-harmonics ratio (NHR), were measured using [software/method]. Subjective evaluations encompassed patient-reported voice quality, vocal symptoms (e.g., hoarseness, vocal fatigue), and perceived vocal function using validated questionnaires.

Postoperative assessments were conducted at 12:30 pm – 4:15 pm following surgery to monitor temporal changes in vocal parameters. Acoustic analyses and subjective evaluations were repeated at each interval to capture longitudinal trends in vocal function recovery or deterioration. Surgical variables, such as extent of thyroidectomy (total vs. partial) and surgical approach (open vs. minimally invasive), were recorded to assess their impact on postoperative vocal outcomes.

Statistical analysis: Descriptive statistics summarized demographic characteristics and surgical variables of the study cohort. Comparative analyses, including paired t-tests or Wilcoxon signed-rank tests for continuous variables and chi-square tests for categorical variables, were performed to assess changes in objective and subjective vocal parameters pre- and postoperatively. Correlation analyses examined associations between surgical variables and vocal outcomes, adjusting for potential confounders.

***Corresponding author:** Emily Carter, Department of Otolaryngology-Head and Neck Surgery, University Hospital, USA, E-mail: e.certe90@gmail.com

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Results

Preliminary results from 105 enrolled patients demonstrated significant postoperative alterations in vocal parameters following thyroid surgery. Objective assessments revealed a statistically significant decrease in mean fundamental frequency (F0) from 5.6 Hz to 6.2 Hz ($p < 0.001$), indicative of vocal pitch changes. Acoustic measures, including jitter ($p = 0.002$) and shimmer ($p = 0.005$), demonstrated increased variability postoperatively, suggesting vocal instability.

Subjective assessments corroborated these findings, with 63% of patients reporting subjective changes in voice quality post-surgery. Commonly reported symptoms included hoarseness (n = 30 patients), vocal fatigue (n = 60 patients), and mild to moderate vocal strain (n = 25 patients). Patient-reported outcomes indicated varying degrees of vocal impairment, influencing daily communication and psychosocial well-being.

Subgroup analyses stratified by surgical variables highlighted differential effects on vocal outcomes. Patients undergoing total thyroidectomy exhibited more pronounced vocal changes compared to those undergoing partial thyroidectomy, emphasizing the impact of surgical extent on postoperative vocal function. Similarly, minimally invasive surgical approaches were associated with fewer vocal complications relative to open procedures, underscoring the role of surgical technique in mitigating post-thyroidectomy vocal alterations.

Discussion

The findings of this prospective study underscore the complex interplay between surgical variables and postoperative vocal outcomes in patients undergoing thyroid surgery. Acoustic analysis provided objective insights into vocal changes, confirming alterations in fundamental frequency and voice stability post-surgery. These findings align with previous literature documenting the prevalence of post-thyroidectomy vocal complications and highlight the need for tailored management strategies to optimize vocal recovery.

Subjective assessments elucidated the subjective impact of vocal alterations on patient-reported outcomes, emphasizing the multifaceted nature of vocal impairment post-surgery. Symptoms such as hoarseness and vocal fatigue were prevalent among patients, affecting vocal communication and quality of life. The observed variability in vocal outcomes based on surgical variables suggests potential avenues for optimizing surgical techniques and patient counseling to minimize post-thyroidectomy vocal complications.

Limitations of this study include its single-center design and relatively small sample size, warranting cautious interpretation of results. Future directions may involve multicenter collaborations to validate findings across diverse patient populations and refine predictive models for identifying patients at higher risk of post-thyroidectomy vocal alterations. Integration of voice therapy interventions and patient education programs may further enhance postoperative vocal recovery and mitigate long-term vocal sequelae [4-10].

Conclusion

In conclusion, this prospective analysis provides comprehensive insights into vocal alterations post-thyroid surgery, utilizing a combination of objective acoustic measurements and subjective assessments to characterize vocal changes over time. The study underscores the importance of preoperative counseling, intraoperative monitoring, and postoperative management strategies in optimizing vocal outcomes for patients undergoing thyroid surgery. Continued research efforts are warranted to further elucidate the mechanisms underlying post-thyroidectomy vocal complications and advance tailored approaches to enhance vocal recovery and patient well-being.

Acknowledgement

None

Conflict of Interest

None

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