Original Article

Cukurova Anestezi ve Cerrahi Bilimler Dergisi

# Evaluation of the Necessity of Thyroidectomy in Laryngeal Cancer Patients Undergoing Total Laryngectomy: A Single Center Experience

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**Abstract**

**Aim:** This study aimed to evaluate the necessity of thyroidectomy in patients undergoing total laryngectomy in a single-center experience. It focused on determining the incidence of thyroid gland invasion and its relationship with tumor stage and localization, and to assess whether routine or selective thyroidectomy is justified. **Methods:** We retrospectively analyzed patients who underwent total laryngectomy between 2019 and 2025. Demographic and clinical data including age, gender, T stage, primary tumor localization, cervical lymph node metastasis, and the addition of thyroid gland excision were evaluated to determine factors associated with thyroidectomy during surgery. **Results:** The mean age of the patients (62 male and 4 female) was 65.9±9. Eight patients had stage T1, 33 T2, 18 T3, and 7 T4. Sixteen patients had supraglottic, 26 glottic, 20 transglottic and 4 patients had subglottic cancer. Fifteen patients had lymph node metastasis. In 26 patients, a lobectomy and in 7 patients total thyroidectomy was performed. **Conclusions:** In our clinic, total laryngectomy is generally preferred for T4a laryngeal tumors, selected T3 supraglottic tumors with high tumor burden and impaired pulmonary function, and transglottic tumors. Based on our findings, thyroid gland invasion is uncommon, and therefore the addition of thyroidectomy to total laryngectomy should not be routine but rather performed selectively according to tumor stage and extension.

**Keywords:** laryngeal cancer; laryngectomy; thyroidectomy; metastasis

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## 1. Introduction

Laryngeal cancer is one of the most common malignancies of the head and neck region, and the majority are squamous cell carcinomas.[1] Although organ-preserving approaches are preferred in early-stage disease, total laryngectomy remains the standard treatment for advanced-stage tumors, particularly T4a lesions.[2] The most important prognostic factors affecting survival are the T stage of the primary tumor and the presence of cervical lymph node metastasis.[3] Anatomically, approximately 50–60% of laryngeal cancers are glottic, 30–40% supraglottic, and a smaller proportion are subglottic.[4]

The necessity of thyroidectomy during total laryngectomy remains controversial. For many years, routine thyroid gland excision was commonly performed because of the presumed high risk of thyroid gland invasion, especially in advanced-stage tumors and tumors with subglottic extension. However, recent studies have demonstrated that the actual incidence of thyroid gland invasion is lower than previously reported, leading to increasing support for a more selective approach.[4,5]

Thyroid gland invasion in laryngeal and hypopharyngeal cancers most commonly occurs through direct extension and lymphatic spread, whereas hematogenous dissemination is rare. Thyroid cartilage destruction, transglottic spread, and particularly subglottic extension greater than 1 cm are considered major risk factors for thyroid gland involvement. In the literature, thyroid gland invasion has been reported in approximately 3–4% of T3 tumors and 20–25% of T4 tumors, with higher rates observed in transglottic tumors with significant subglottic extension.[6,7]

Although thyroidectomy may improve oncological control in selected patients, it is associated with increased postoperative morbidity, including hypothyroidism, hypoparathyroidism, hypocalcemia, and prolonged operative time. Therefore, unnecessary thyroid gland excision should be avoided whenever possible.[8]

Currently, many centers recommend thyroidectomy only in cases with thyroid cartilage invasion, significant subglottic extension, esophageal involvement, or radiological/intraoperative suspicion of thyroid gland infiltration. This selective strategy aims to maintain oncological safety while reducing endocrine complications.[9]

This study aimed to evaluate the necessity of thyroidectomy in patients undergoing total laryngectomy in a single-center experience by determining the incidence of thyroid gland invasion and its relationship with tumor stage and localization.

## 2. Materials and Methods

In this retrospective study, 66 patients admitted to Adana City Training and Research Hospital who underwent total laryngectomy between 2019 and 2025 were evaluated. The patients' age and gender, T stage, primary tumor localization, cervical lymph node metastasis, and whether thyroid gland resection was performed in addition to surgery were recorded.

The study was approved by the Scientific Research Ethics Committee of Adana City Training and Research Hospital (Date: 30.03.2026, Number: 1251) and was conducted by the 2013 Declaration of Helsinki.

All patients were staged preoperatively with endoscopic evaluation and imaging studies as computed tomography and magnetic resonance imaging. Staging was performed according to American Joint Committee on Cancer TNM classification system based on the size of the tumor (T), regional lymph node involvement (N), and distant metastasis (M). [6]

Patients undergoing laryngectomy for primary or recurrent laryngectomy were included in the study. Patients with incomplete medical records, patients with insufficient follow-up duration, patients with primary thyroid malignancy and those with involvement of hypopharyngeal region were not included in the study.

### *2.1. Statistical analysis*

The statistical analysis was performed using SPSS version 27.0 software (SPSS Inc., Chicago, Illinois, United States). In the study, descriptive data were presented as % for categorical variables and as mean ± standard deviation. Because of the low expected cell counts, Fisher's Exact Test was used. A p value of $<0.05$ was considered significant.

## 3. Results

A total of 66 patients were included in the study, of whom 62 (93.9%) were male and 4 (6.1%) were female. The mean age was 65.9 ± 9 years. (Table 1)

Regarding T stage distribution, 8 patients had T1 disease, 33 had T2, 18 had T3, and 7 had T4 tumors. In terms of primary tumor localization, 16 tumors were supraglottic, 26 were glottic, 20 were transglottic, and 4 were subglottic. Cervical lymph node metastasis was detected in 15 patients (22.7%). (Table 1)

All of the patients had squamous cell carcinoma, mostly well-differentiated. No extracapsular spread was observed. Lymphovascular invasion was present in 2 patients, while perineural invasion was detected in 3 patients.

**Table 1. The distribution of patients**

| Variable | Number of patients | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 62 | 93.9 |
| Female | 4 | 6.1 |
| **Mean age (years)** | 65.9 ± 9 | |
| **T stage** | | |
| T1 | 8 | 12.1 |
| T2 | 33 | 50 |
| T3 | 18 | 27.3 |
| T4 | 7 | 10.6 |
| **Primary tumor localization** | | |
| Supraglottic | 16 | 24.2 |
| Glottic | 26 | 39.4 |
| Transglottic | 20 | 30.3 |
| Subglottic | 4 | 6.1 |
| **Cervical lymph node metastasis** | 15 | 22.7 |
| **Thyroid resection** | | |
| Unilateral lobectomy | 26 | 39.4 |
| Total thyroidectomy | 7 | 10.6 |
| No thyroid resection | 33 | 50 |
| **Thyroid gland invasion** | | |
| Positive | 2 | 3 |
| Negative | 64 | 97 |

Thyroid gland resection was performed in a subset of patients, with unilateral lobectomy carried out in 26 patients and total thyroidectomy in 7 patients. (Table 1) Thyroid resection was particularly preferred in cases demonstrating transglottic spread and subglottic extension. In our series, true thyroid gland invasion was identified in only 2 patients (3%). (Table 1) No statistically significant association was found between thyroid resection and histopathological thyroid gland invasion. ($p = 0.492$)

Among the 2 patients with thyroid gland invasion, both had advanced primary tumors (T3–T4a), and one patient had cervical lymph node metastasis (N1). No thyroid invasion was observed in early-stage tumors (T1–T2). Although thyroid gland invasion was observed only in advanced-stage tumors (T3–T4), the association did not reach statistical significance ($p = 0.139$). This may be related to the limited sample size and the very low incidence of thyroid invasion.

## 4. Discussion

Laryngeal cancers most commonly originate from the vocal cords, and more than 95% of cases are squamous cell carcinomas.[10] Approximately 50–60% of laryngeal cancers are glottic and 30–40% are supraglottic, whereas subglottic tumors are rare.[4] In our study, primary tumor localization was supraglottic in 24%, glottic in 40%, transglottic in 30%, and subglottic in 6% of patients. Notably, all recurrence cases were transglottic tumors. This finding suggests that transglottic tumors may exhibit more aggressive behavior and possess a higher potential for submucosal spread.

The female-to-male ratio in our clinic was 1:16, which is consistent with the 1:5 to 1:20 ratio reported in the literature. Laryngeal cancers are most frequently observed in the fifth to seventh decades of life.[11] The mean age in our study was 65.9 ± 9 years, in parallel with published data.

Total laryngectomy is the standard treatment method for T4a tumors and selected T3 cases.[12] In our clinic, primary surgical treatment is recommended for T4a laryngeal tumors. Additionally, total laryngectomy is preferred in selected T3 supraglottic and transglottic tumors with high tumor burden or limited pulmonary reserve. In early-stage tumors, organ-preserving surgery or radiotherapy options are evaluated, and selected T3 and early-stage cases may be referred for radiotherapy.[12] In our study, surgery was preferred as the primary treatment in patients with T4 disease and in selected T3 cases.

The presence of cervical lymph node metastasis is one of the most important prognostic factors in laryngeal cancer and significantly affects survival.[3] In our series, lymph node metastasis was detected in 22.7% of patients, which is consistent with the literature.

Most primary patients presented with advanced-stage tumors. Among patients who underwent neck dissection, the metastasis rate was 30%, consistent with the 20–30% range reported in the literature.[13] Due to the rich lymphatic drainage of the supraglottic region, cervical metastasis rates in supraglottic tumors have been reported between 25–50%.[14] In our series, the metastasis rate in supraglottic tumors was 30%.

In our clinical practice, thyroidectomy is mainly performed in T4a tumors and in cases with significant subglottic extension, while a more conservative approach is adopted in other patients. Thyroid resection was particularly preferred in cases demonstrating transglottic spread and subglottic extension. In our series, true thyroid gland invasion was identified in only 2 patients (3%) which is consistent with the literature. No statistically significant association was found between thyroid resection and histopathological thyroid gland invasion. Therefore thyroidectomy decision should be made selectively.

Thyroid gland invasion is reported to be more common in transglottic and subglottic tumors.[7] However, several studies have demonstrated that routine thyroidectomy increases the risk of unnecessary hypothyroidism and hypoparathyroidism.[5] The true incidence of thyroid gland invasion is lower than clinically presumed. Therefore, the current approach favors selective rather than routine thyroidectomy.[8]

The necessity of thyroidectomy during laryngectomy remains controversial. Thyroid gland invasion is rare in T3 tumors and more frequent in T4 tumors. One study reported thyroid invasion rates of 3.45% in T3 tumors and 24% in T4 tumors.[15] Another study found an invasion rate of 4.3% in patients undergoing thyroidectomy with total laryngectomy, all of whom had transglottic tumors with more than 1 cm subglottic extension.[16]

In our series, 26 unilateral and 7 bilateral thyroid resections were performed, and thyroid gland invasion was detected in only 2 patients (3%). In our series, thyroid gland invasion was identified exclusively in patients with advanced-stage disease (T3–T4a). One of these patients also had cervical lymph node metastasis. Although statistical significance was not achieved, these findings support previous reports suggesting that advanced tumor stage and regional spread increase the risk of thyroid gland invasion. Therefore, thyroidectomy during total laryngectomy may be more appropriately reserved for selected

high-risk patients rather than performed routinely. These findings are consistent with the literature. Routine thyroidectomy is not recommended in the absence of thyroid cartilage invasion, significant subglottic extension, or esophageal involvement.[5,7] Routine thyroidectomy may increase the risk of hypothyroidism and hypoparathyroidism; therefore, a more selective approach appears justified.

This study has several limitations. First, its retrospective and single-center design may have introduced selection bias. Second, the sample size was relatively small, particularly limiting the statistical power of the analyses. In addition, thyroid resection was performed selectively rather than routinely, which may have affected the assessment of the true incidence of thyroid gland invasion.

In conclusion, the decision to perform thyroidectomy during total laryngectomy should not be routine but rather based on tumor stage, location, and pattern of spread. Preservation of the thyroid gland appears safe, particularly in T3 tumors with intact thyroid cartilage. A selective thyroidectomy strategy reduces unnecessary surgical morbidity and contributes positively to patient quality of life.

**genAI:** No artificial intelligence-based tools or generative AI technologies were used in this study. The entire content of the manuscript was originally prepared, reviewed, and approved by all authors.

**Statement of Ethics:** The study was approved by the Scientific Research Ethics Committee of Adana City Training and Research Hospital (Date: 30.03.2026, Number: 1251) and was conducted in accordance with the Declaration of Helsinki.

**Data Availability:** The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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