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Treatment Outcomes in Patients with Laryngeal and Hypopharyngeal Squamous Cell Carcinomas

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ABSTRACT

Introduction: Head and neck malignancies are among the most common cancers worldwide, ranking as the sixth leading cause of cancer-related mortality. Over 90% of these are squamous cell carcinomas (SCCs), with the larynx being the most frequently affected site. Optimal treatment of laryngeal and hypopharyngeal cancers requires a multidisciplinary approach and depends on tumor stage, patient health, and available healthcare resources. **Aim:** To evaluate treatment outcomes in patients with laryngeal and hypopharyngeal SCCs, using local recurrence or residual disease as key outcome measures. **Methods:** This observational study was conducted in the Department of Otolaryngology–Head & Neck Surgery, BSMMU, from June 2022 to July 2023. Out of 120 available records, 100 patients with histopathologically proven SCCs of the larynx or hypopharynx and a minimum follow-up of 6 months were included. Data were analyzed for recurrence/residual disease rates according to tumor stage and treatment modality. **Results:** Of the 100 patients, 88% were male and 12% female, with a mean age of 60.8 years and mean follow-up of 37.7 months. Carcinoma glottis was the most common diagnosis (38%). Advanced-stage disease (T3–T4) accounted for 59% of cases. Recurrence/residual tumor was found in 13% of early-stage patients and 25% of advanced-stage patients. The highest recurrence rate (32.2%) was observed in patients treated with chemoradiotherapy (CT/RT) as the primary modality. No recurrence was observed in patients treated with surgery alone. **Conclusion:** Higher recurrence rates were observed in patients treated primarily with CT/RT, suggesting that alternative treatment approaches, such as conservative endolaryngeal surgery, may offer improved outcomes in early-stage disease. Larger multicenter studies are warranted to validate these findings.

Keywords: Squamous Cell Carcinoma, Laryngeal Cancer, Hypopharyngeal Cancer, Chemoradiotherapy, Recurrence.

INTRODUCTION

Head and neck malignancies represent a major global health burden, accounting for nearly 6% of all cancers and ranking as the sixth leading cause of cancer-related deaths worldwide [1]. Among these, squamous cell carcinoma (SCC) is the most common histopathological type, constituting over 90% of cases [2,3]. The larynx is the most frequently affected subsite in the head and neck region, with carcinoma of the glottis being the most common [4]. The incidence of laryngeal and hypopharyngeal cancers varies geographically, with higher prevalence reported in South Asia, France, South America, and Eastern Europe [3,5]. Risk factors include tobacco use, excessive alcohol consumption, poor oral hygiene, chronic laryngopharyngeal reflux, and, in some cases, human papillomavirus (HPV) infection [6]. The disease predominantly affects men, likely reflecting higher exposure to risk factors in this population [7]. Management of laryngeal and hypopharyngeal SCC requires a multidisciplinary approach involving surgery, radiotherapy, chemotherapy, and rehabilitation services [8]. Treatment decisions are guided by tumor stage, location, patient comorbidities, pulmonary reserve, and availability of specialized treatment facilities [9]. The goal is not only to achieve oncological control but also to preserve organ function and quality of life. For early-stage tumors (T1–T2), organ-preservation strategies are preferred, with either radiotherapy or conservative endolaryngeal surgery (laser excision, cordectomy) yielding excellent local control rates exceeding 80–90% [10,11]. In patients with advanced but operable tumors (T3–T4), surgery followed by adjuvant radiotherapy or chemoradiotherapy is considered the standard of care [12]. Non-operable or metastatic disease is usually managed with definitive chemoradiotherapy or palliative treatment [13]. Despite advancements in treatment, recurrence or residual disease remains a significant challenge, adversely impacting survival and functional outcomes [14]. Recurrence rates vary by stage and treatment modality, with higher rates generally reported in advanced tumors and in patients treated with CT/RT alone [15]. Evaluating treatment outcomes in a real-world setting is therefore crucial to identify gaps in current practice and guide future management strategies. The present study aims to analyze the treatment outcomes of laryngeal and hypopharyngeal SCC patients treated at a tertiary care center, focusing on recurrence and residual disease rates and correlating them with tumor stage and primary treatment modality.

MATERIALS AND METHODS

This observational study was conducted at the Department of Otolaryngology–Head & Neck Surgery, BSMMU, from June 2022 to July 2023.

Inclusion Criteria

- Histopathologically proven SCC of the larynx or hypopharynx
- Minimum follow-up of 6 months after completion of primary treatment

Exclusion Criteria

- Incomplete medical records
- Patients lost to follow-up

Tumor staging was performed using the TNM classification. Stages T1 and T2 were classified as early-stage disease, while T3 and T4 were classified as advanced-stage disease.
Treatment outcomes were categorized as:

- **No recurrence/residual disease** – disease-free ≥ 6 months post-treatment
- **Recurrence/residual disease** – biopsy-proven SCC at the primary site ≥ 6 months post-treatment

Surgical procedure

All patients underwent minimally invasive parathyroidectomy (MIP) under general anesthesia. A focused cervical incision was made, and the suspected adenomatous gland was excised. Adequacy of excision was confirmed by a ≥50% fall in ioPTH compared to baseline. In cases where biochemical cure was not achieved, further exploration was performed.

Data were analyzed using percentages, Chi-square test, Fisher's exact test, and Kaplan–Meier survival curves where applicable. SPSS (Chicago, IL) was used for statistical analysis, with $p < 0.05$ considered significant.

RESULTS

A total of 120 medical records of patients with histopathologically confirmed squamous cell carcinoma (SCC) of the larynx and hypopharynx were reviewed. Twenty patients were excluded due to incomplete records or inadequate follow-up. The final study cohort comprised 100 patients who fulfilled all inclusion criteria.

Patient Demographics

Of the 100 patients, 88 (88%) were male and 12 (12%) were female, yielding a male-to-female ratio of 7.3:1. The age of the patients ranged from 41 to 80 years, with a mean age of 60.82 ± 9.4 years. The minimum follow-up duration was 6 months and the maximum was 192 months, with a mean follow-up of 37.7 months.

Tumor Site Distribution

The most common primary site was the glottis, followed by supraglottis, post-cricoid/pyriform sinus (PFS), and transglottic region.

Table 1: Distribution of Patients by Primary Site

Primary Site	Frequency (n=100)	Percentage (%)
Glottis	38	38%
Supraglottis	23	23%
PFS	22	22%
Transglottis	17	17%

Carcinoma of the glottis accounted for more than one-third of all cases (38%), whereas transglottic carcinoma was the least common (17%).

Tumor Stage Distribution

The majority of patients presented with advanced-stage disease (T3–T4).

- **T1:** 11 patients (11%)
- **T2:** 26 patients (26%)
- **T3:** 54 patients (54%)
- **T4:** 5 patients (5%)

Thus, 59% of patients were in the advanced stage (T3–T4) at the time of diagnosis.

Recurrence and Residual Disease

Out of 100 patients, 16 were found to have recurrent or residual disease during follow-up. The recurrence rate varied by tumor stage:

- **T1:** 3 of 11 patients (27%)
- **T2:** 2 of 26 patients (10%)
- **T3:** 10 of 54 patients (18.5%)
- **T4:** 1 of 5 patients (20%)

Overall recurrence was 13% in early-stage disease (T1–T2) and 25% in advanced-stage disease (T3–T4).

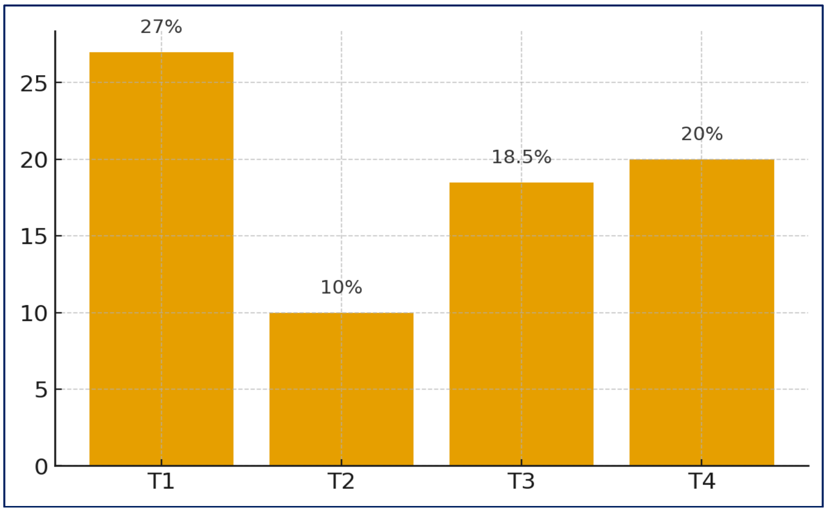

Figure 1: Presence of recurrent/residual tumor based on pre-treatment T stage

Treatment Modalities and Outcomes

Among the 100 patients, 59 received chemoradiotherapy (CT/RT) as their primary treatment, 15 underwent surgery alone, and 20 underwent surgery followed by adjuvant CT/RT.

Table 2: Recurrence/Residual Disease According to Treatment Modality

Treatment Modality	No Recurrence (n)	Recurrence/Residual (n)	Total (n)	Recurrence Rate (%)
CT/RT	40	19	59	32.2%
Surgery	15	0	15	0%
Surgery + CT/RT	17	3	20	15%

The highest recurrence rate was observed in the CT/RT group (32.2%), while no recurrence was observed in the surgery-alone group. Patients treated with combined modality therapy had a recurrence rate of 15%, lower than CT/RT alone.

DISCUSSION

The findings of this study provide important insights into the treatment outcomes of laryngeal and hypopharyngeal SCC in a tertiary care hospital. The observed male predominance (88%) aligns with epidemiological data worldwide, which attribute the disparity to higher exposure to smoking and alcohol among men [6,7]. The mean age of 60.8 years is also consistent with previous reports, which indicate that these cancers are rare before the age of 40 years and peak in the sixth and seventh decades of life [7,8]. In this study, 59% of patients presented with advanced-stage disease (T3–T4), a finding consistent with several other studies showing that most patients present late due to lack of awareness, delayed referrals, or inadequate screening [3,5]. Early symptoms such as hoarseness, dysphagia, or throat discomfort are often ignored, contributing to delayed diagnosis [16]. Public health initiatives focused on education and early detection could significantly improve outcomes. The recurrence rate observed in early-stage disease (13%) was higher than those reported in the literature, where local control rates for early glottic carcinoma range between 75–100% following radiotherapy or surgery [10,11]. Possible reasons include suboptimal radiotherapy planning, patient noncompliance, or delayed follow-up. Notably, T1 tumors in this cohort showed a recurrence rate of 27%, which is higher than expected and warrants review of treatment protocols and quality assurance in radiotherapy services. Patients treated with CT/RT as the primary modality had the highest recurrence rate (32.2%), which corroborates reports that exclusive chemoradiotherapy, while organ-preserving, may not always achieve optimal local control in resource-limited settings [13,17]. Conversely, patients treated with surgery alone had no recurrence, emphasizing the importance of surgical intervention for appropriately selected cases. Surgery combined with adjuvant therapy achieved better outcomes than CT/RT alone, reinforcing the benefit of a multimodality approach for advanced disease [12,18]. Our findings support the consideration of conservative endolaryngeal surgery as a first-line treatment for early laryngeal cancers, particularly in centers where radiotherapy facilities are limited or outcomes are suboptimal. Several studies have shown comparable cure rates between transoral laser microsurgery and radiotherapy for early-stage laryngeal SCC, with the additional advantage of reduced treatment duration and avoidance of long-term radiation-related complications [11,19]. Finally, the relatively high recurrence rate in this study compared with global benchmarks highlights the need for better treatment planning, robust follow-up protocols, and quality improvement measures in cancer care delivery. Prospective, multicenter studies with standardized treatment protocols are necessary to validate these findings and optimize outcomes in our population.

CONCLUSION

Recurrence/residual disease was most frequent among patients treated with CT/RT as the primary modality, with surgery demonstrating superior local control. These findings suggest that conservative surgical approaches may be preferable for early-stage disease, particularly in settings where radiotherapy outcomes are suboptimal. Multicentric studies with larger sample sizes are needed to establish evidence-based treatment guidelines tailored to regional contexts.

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