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Analysis of surgical outcomes of patients with laryngeal cancer

Larenks kanserli hastaların cerrahi sonuçlarının analizi

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ABSTRACT

Objectives: This study aims to evaluate tumor localization, histopathological characteristics, surgical approaches, and clinical outcomes by comparing the findings with the existing literature.

Patients and Methods: Data from 55 male patients (mean age: 57.3±13.3 years; range, 39 to 88 years) who underwent surgical treatment for laryngeal cancer were retrospectively analyzed between November 2014 and December 2023. Surgical techniques included total or partial laryngectomy and neck dissection. Tumor localization, histopathology, staging, and demographic data were documented.

Results: All patients were smokers. Alcohol use was reported by 23 (41.8%) patients. The most common symptom was hoarseness, observed in 43 (78.1%) patients, followed by dysphagia in nine (16.3%) patients and dyspnea in six (10.9%) patients. Tumor localization was primarily glottic in 26 (47.3%) patients and transglottic in 17 (30.9%) patients. Total laryngectomy was performed in 38 (69.1%) patients, and 13 (28.9%) patients had neck metastases. Squamous cell carcinoma was the predominant histopathological finding in 54 (98.2%) patients, with 29 (52.7%) patients showing moderate differentiation. Advanced-stage tumors (T3-T4) were identified in 28 (50.9%) patients.

Conclusion: Laryngeal cancer predominantly affects males with a history of smoking and alcohol use. Surgical treatment, particularly total laryngectomy, remains the workhorse of management. Neck dissection is critical for addressing lymphatic spread. These findings align with the literature, emphasizing the need for tailored treatment approaches to improve clinical outcomes.

Keywords: Laryngeal cancer, neck dissection, partial laryngectomy, surgical outcomes, total laryngectomy.

ÖZ

Amaç: Bu çalışmada, tümör lokalizasyonu, histopatolojik özellikler, cerrahi yaklaşımlar ve klinik sonuçlar mevcut literatür ile karşılaştırılarak değerlendirildi.

Hastalar ve Yöntemler: Kasım 2014 - Aralık 2023 tarihleri arasında larenks kanseri nedeniyle cerrahi tedavi uygulanan 55 erkek hastanın (ort. yaş: 57.3±13.3 yıl; dağılım, 39-88 yıl) verileri retrospektif olarak analiz edildi. Kullanılan cerrahi teknikler total veya kısmi larenjektomi ve boyun diseksiyonu idi. Tümör lokalizasyonu, histopatoloji, evreleme ve demografik veriler kaydedildi.

Bulgular: Tüm hastalar sigara kullanıyordu. Alkol kullanımı 23 (%41.8) hasta tarafından bildirildi. En sık semptom 43 (%78.1) hasta ile ses kısıklığıydı ve bunu dokuz (%16.3) hastada disfaji ve altı (%10.9) hastada dispne takip etti. Tümör lokalizasyonu 26 (%47.3) hastada primer olarak glottik idi ve 17 (%30.9) hastada transglottik idi. Otuz sekiz (%69.1) hastada total larenjektomi uygulandı ve 13 (%28.9) hastada boyun metastazı vardı. Skuamöz hücreli karsinom 54 (%98.2) hastada baskın histopatolojik bulguydu ve 29 (%52.7) hasta orta derecede diferansiyasyon gösteriyordu. İleri evre tümörler (T3-T4) 28 (%50.9) hastada tespit edildi.

Sonuç: Larenks kanseri, ağırlıklı olarak sigara ve alkol kullanımı öyküsü olan erkekleri etkiler. Cerrahi tedavi, özellikle total larenjektomi, tedavinin temeli olmaya devam etmektedir. Boyun diseksiyonu, lenfatik yayılımın kontrolü için kritik öneme sahiptir. Bulgular literatürle uyumludur ve klinik sonuçları iyileştirmek için özelleştirilmiş tedavi yaklaşımlarına duyulan ihtiyacı vurgulamaktadır.

Anahtar sözcükler: Larenks kanseri, boyun diseksiyonu, kısmi larenjektomi, cerrahi sonuçlar, total larenjektomi.

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Laryngeal cancers constitute almost one third of all head and neck cancers. The larynx consists of three parts: glottis, supraglottis, and subglottis. Laryngeal cancers originate from one of these three regions. The most common histologic subtype is squamous cell carcinoma.[1] Laryngeal cancer is most commonly observed in smokers. Alcohol use is the second most important risk factor. Smoking and alcohol synergistically increase the risk.[2]

Surgery plays an important role in the treatment of laryngeal cancer. The treatment plan is usually determined according to the stage and location of the tumor. While partial surgeries are preferred in patients with early tumor location suitable for partial surgery, total laryngectomy is usually performed in more advanced tumors. Prophylactic neck dissection is performed even if there is no clinically metastatic lymph node in the neck, particularly in patients with advanced tumors or tumors located in the supraglottic region.[3-5]

The aim of this study was to review patients who underwent surgical treatment for laryngeal cancer and to evaluate tumor localization, histopathological features, surgical methods, and clinical outcomes in these patients. In addition, it was aimed to contribute to the effectiveness of treatment strategies by comparing these data with the existing findings in the literature.

PATIENTS AND METHODS

This retrospective study was conducted with 55 male patients (mean age: 57.3±13.3 years; range, 39 to 88 years) who underwent surgical treatment for laryngeal cancer in the otolaryngology clinic of Medipol University Hospital between November 2014 and December 2023. Patients who underwent total or partial laryngectomy as surgical treatment were included in the study. Patients who underwent endoscopic surgery, those who refused surgical treatment, those who underwent salvage surgery after radiotherapy failure, and those who underwent chemoradiotherapy as primary treatment were excluded. Written informed consent was obtained from all participants. The study protocol was approved by the Medipol University Ethics Committee (date: 11.4.2024, no: E-10840098-202.3.02-6704). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Age, sex, smoking history, presenting symptoms, tumor localization, histopathological diagnosis, tumor stage, neck metastasis status, and surgical methods were recorded. Anatomical localization of the tumors was classified as glottic, supraglottic, transglottic, and subglottic regions. Histopathological examinations were performed to determine the type and degree of differentiation of the tumors. Histopathological staging of the tumors was also recorded.

Surgical procedures such as total laryngectomy and partial laryngectomy were analyzed, and surgical techniques such as supracricoid, supraglottic, and frontolateral laryngectomy were evaluated in patients who underwent partial laryngectomy. Patients who underwent neck dissection were also recorded as bilateral or unilateral neck dissection.

All patients underwent oropharyngeal, nasal, laryngeal, neck, and systemic examinations. Video laryngostroboscopy and direct laryngoscopy were used to determine the location and size of the lesion. After clinical evaluation of tumor size and extent, all patients were radiologically imaged with neck computed tomography or magnetic resonance imaging. Histopathologic diagnosis was made preoperatively by taking a biopsy from each patient under direct laryngoscopy. The 2018 American Joint Committee on Cancer head and neck cancer staging system was used for tumor staging.

Statistical analysis

The data obtained from the study were analyzed using IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). Descriptive statistics (mean ± standard deviation, min-max, and percentage) were used to analyze the demographic data, tumor localization, stage, and distribution of surgical methods. Mean and standard deviation values were calculated for continuous variables, and percentage distributions were calculated for categorical variables.

RESULTS

Fifty-three (96.36%) of the patients had a smoking history of one pack or more per day. Alcohol use was also present in 23 (41.8%) of the patients. The most common symptom was hoarseness, which occurred in 43 (78.1%) patients, followed by dysphagia in nine (16.3%) patients and dyspnea in six (10.9%) patients. Less frequently, a mass in the neck was reported in five (9.1%) patients, hemoptysis in two (3.6%) patients, and sore throat in two (3.6%) patients (Table 1).

When tumor localization was evaluated, 26 (47.3%) cases were located in the glottic region. The second most common localization was the transglottic region, with 17 (30.9%) cases. Supraglottic tumors were

Table 1
Patient demographics, smoking, alcohol use, and symptoms (n=55)

	n	%	Median	Range
Age (years)			57.3	39-88
Gender				
Male	55	100		
Female	0	0		
Smoking history				
Smoker	55	100		
Non-smoker	0	0		
Alcohol use				
Alcohol user	23	41.8		
Non-alcohol user	32	58.2		
Symptoms				
Hoarseness	43	78.1		
Dysphagia	9	16.3		
Dyspnea	6	10.9		
Neck mass	5	9.1		
Hemoptysis	2	3.6		
Sore throat	2	3.6		

Table 2
Tumor localization and surgical procedures

	n	%
Localization		
Glottic	26	47.3
Transglottic	17	30.9
Supraglottic	10	18.2
Subglottic	2	3.6
Surgical procedure		
Total laryngectomy	38	69.1
Partial laryngectomy	17	30.9
Supracricoid laryngectomy	6	10.9
Supraglottic laryngectomy	4	7.3
Frontolateral laryngectomy	7	12.7

observed in 10 (18.2%) cases. Subglottic localization was detected in two (3.6%) cases. In total, 38 (69.1%) patients underwent total laryngectomy, and 17 (30.9%) patients underwent partial laryngectomy. Among the patients who underwent partial laryngectomy, supracricoid laryngectomy was performed in six (10.9%) patients, supraglottic laryngectomy in four (7.3%) patients, and frontolateral laryngectomy in seven (12.7%) patients. In addition, 42 patients underwent bilateral neck dissection, and three patients underwent unilateral neck dissection (Table 2).

Table 3
Histopathological diagnosis and tumor staging

	n	%
Histopathological diagnosis		
Basosquamous carcinoma	1	1.8
Squamous cell carcinoma	54	98.2
Well differentiated	19	34.5
Moderately differentiated	29	52.7
Poorly differentiated	7	12.7
Tumor stage		
T1	4	7.3
T2	23	41.8
T3	21	38.2
T4	7	12.7
N0 (No neck metastasis)	32	71.1
Neck metastasis (N1-N2-N3)	13	28.9
N1	5	11.1
N2	8	17.8
N3	0	0

Histopathologic diagnosis was basosquamous carcinoma in one (1.8%) patient, and squamous cell carcinoma in the remaining 54 (98.2%) patients. According to the histopathological differentiation grade of the tumor, 19 (34.5%) patients were well differentiated, 29 (52.7%) patients were moderately differentiated, and seven (12.7%) patients were poorly differentiated. When the tumor staging of the patients was examined as a result of histopathological examination, it was determined that four (7.3%) patients were in T1 stage, 23 (41.8%) patients were in T2 stage, 21 (38.2%) patients were in T3 stage, and seven (12.7%) patients were in T4 stage. Histopathologic examination of 45 patients who underwent neck dissection revealed neck metastases in 13 (28.9%) patients. As a result of the examination, 32 (71.1%) patients were diagnosed as N0, five (11.1%) patients were diagnosed as N1, and eight (17.8%) patients were diagnosed as N2. The N3 stage was not detected in any patient (Table 3).

DISCUSSION

Laryngeal cancer is more common in males than in females.[6] Smoking and alcohol use are the two main factors that increase the risk of laryngeal

cancer. One study found that smoking and alcohol consumption increased the risk of laryngeal and hypopharyngeal cancer with a multiplier effect, and the combination of these two factors significantly increased the risk compared to their independent use.[7] High alcohol consumption in nonsmokers and smoking in nondrinkers also independently lead to head and neck cancers.[8] These findings in the literature are in parallel with the results obtained in our study. All patients in our study were male. All of them were smokers, and about half of them had concomitant alcohol use.

Laryngeal cancers usually present with hoarseness, primarily because the glottic region is the most commonly involved anatomical region. Tumors in the glottic region directly affect the vocal cords, disrupting the vibratory properties of the voice and causing dysphonia.[9] On the other hand, supraglottic tumors may cause dysphonia by altering the vocal resonance. However, laryngeal cancers may present with dysphagia, hemoptysis, dyspnea, or neck mass.[10] Similar findings were observed in our study, with dysphonia being the most common symptom. Dysphagia, hemoptysis, neck mass, and dyspnea were observed less frequently.

The most common histopathologic type of laryngeal cancer is squamous cell carcinoma.[11] The most common site of localization is the glottic region. Localization in the glottic region is a common finding in laryngeal cancers.[12] In contrast, supraglottic and subglottic regions are described as less common tumor sites.[13] In our study, it was observed that glottic region tumors were the most common site of localization, and this finding was consistent with the data in the literature.

Surgery plays an important role in the treatment of laryngeal cancer. The choice between total and partial laryngectomy depends on tumor location, stage, and patient-based factors.[14] In cases where the cancer is more localized, open partial laryngectomy options, such as supracricoid, supraglottic laryngectomy, or vertical hemilaryngectomies, and endoscopic partial laryngectomy options can achieve good oncological outcomes while preserving the organ. Studies show that these procedures allow effective management of the disease while preserving functionality, particularly in early-stage or limited tumors.[15-18] However, total laryngectomy remains the standard treatment in more advanced stages or when tumor spread makes organ preservation difficult.[19,20] In advanced laryngeal cancers, total laryngectomy as the primary treatment provides higher survival than organ-sparing treatment protocols.[21] In our study, total laryngectomy was performed in the majority of cases, reflecting the need for more aggressive surgical intervention due to the prevalence of the disease. While partial laryngectomy was performed in selected cases to preserve laryngeal function when possible. Total laryngectomy was also utilized for some early-stage (T2) tumors. This approach was necessary in cases where the tumor originated from the subglottic region or in patients with poor physical performance who were deemed unfit to tolerate partial laryngectomy. In certain cases, total laryngectomy was chosen as an alternative when radiotherapy was declined by the patient. These decisions emphasize the importance of individualized treatment planning based on both tumor characteristics and patient-specific factors. Furthermore, neck dissection is a common additional procedure, particularly when there is a risk of lymphatic spread, and plays an important role in reducing the risk of metastasis.[22] In our study, neck dissection was performed either therapeutically in patients with clinical neck metastases or prophylactically in patients at high risk of occult metastases. These results are consistent with current clinical practice and emphasize the importance of individualizing treatment plans based on both tumor characteristics and patient factors.

This study had some limitations. First, since the study was based on a retrospective design, possible information gaps and inaccuracies may have been present during data collection. Additionally, incomplete patient follow-up and data recording may have been present. Furthermore, since our study was conducted in a single center, the results may be limited in terms of generalizability. In addition, the relatively limited number of patients (n=55) made it difficult to perform more comprehensive analyses. Finally, we did not have the opportunity to compare the effects of other treatment modalities (e.g., radiotherapy and chemotherapy) other than surgery; therefore, the effects of surgery on survival and prognosis could not be addressed in a more comprehensive approach.

In conclusion, laryngeal cancers are mostly observed in male patients. Smoking and alcohol use are the most important risk factors. Surgical treatment plays a critical role in the management of laryngeal cancer. Total and partial laryngectomy options should be carefully selected based on the stage of the tumor and the general condition of the patient. Total laryngectomy is more commonly preferred for advanced tumors, while partial laryngectomy is performed for organ preservation in more limited tumors. Neck dissection should also be performed in patients at risk of lymphatic spread.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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