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Original Article

Frequency of Lymph Node Metastasis in Supraglottic Carcinoma Larynx

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Abstract:

Background: *Supraglottic laryngeal carcinoma presents a significant risk for cervical lymph node metastases, which significantly influences prognosis and treatment planning. Knowledge of the pattern and frequency of nodal involvement is essential for appropriate clinical management. To determine the frequency, pattern, and characteristics of cervical lymph node involvement in individuals with supraglottic laryngeal carcinoma.*

Methods*: This cross-sectional study at Mymensingh Medical College (July 2024–May 2025) included 40 patients with supraglottic squamous cell carcinoma. Diagnosis and tumor assessment were done via history, ENT exam, laryngoscopy, imaging, and biopsy. Data were analyzed descriptively. Approval of ethical standards and consent from participantswere obtained, maintaining confidentiality.*

Results*: Cervical lymph node metastasis was present in 40% of patients, most frequently affecting Level II (50%) and Level III (37.5%) nodes. Nodal involvement was predominantly homolateral (87.5%), with N1 disease being the most common stage (62.5%). Bilateral involvement was observed in 12.5% of cases. The majority of patients exhibited early tointermediate stage disease, and well-differentiated squamous cell carcinoma was the predominant histological type (57.5%).*

Conclusion*: Cervical lymph node metastasis occurs commonly in supraglottic carcinoma, with early-stage, homolateral nodal involvement predominating. Careful assessment of cervical nodes, particularly Levels II and III, is crucial for optimal management.*

Keywords: *Laryngeal cancer, Lymph node metastasis, Supraglottic carcinoma, TNM staging*

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Introduction:

Laryngeal cancer is the most common malignancy, in more than 95% of instances representing squamous cell carcinoma[1] Smoking and excessive alcohol consumption are the principal risk factors[2]. The disease predominantly affects older males and often presents with hoarseness of voice. The supraglottic region is the most frequently involved subsite, followed by the glottic and subglottic areas, with the majority of instances being squamous cell carcinoma[3,4]. Numerous patients arrive at later stages, highlighting the critical need for early detection and intervention [4].

Supraglottic tumors are particularly prone to metastasis to regional lymph nodes because of the dense lymphatic network in this area. Metastatic spread commonly occurs in the upper and middle jugular lymph node groups, often bilaterally[5]. Postoperative complications such as wound infection, pharyngocutaneous fistula, hemorrhage, and stoma-related issues are frequently observed, especially in patients, prior radiotherapy, or comorbidities[6].

Significantly more than the 8% observed in glottic cancers, approximately 19.9% of supraglottic tumors exhibit lymph node metastasis[7]. Large-cohort studies indicate that about 40% of patients with supraglottic squamous cell carcinoma develop, with rates increasing from early T stages to over 50% in advanced stages[8]. European clinical series have similarly shown that 55% of early-stage (pT1/2) and 67% of advanced-stage (pT3/4) supraglottic tumors demonstrate cervical nodal involvement[9].

In Bangladesh, studies have confirmed that the most frequently affected in laryngeal carcinoma, Cancer cells occurring in a substantial proportion of patients, many of whom present at advanced stages[10,11]. Level II and III lymph nodes are particularly prone to metastasis, and the incidence rises with increasing tumor stage[11].

Most existing research in Bangladesh is descriptive, concentrating on clinical and histopathological characteristics,the association between tumor stage and prognosis, or the integration of imaging and molecular markers for subsite-specific management remain limited. This study aimed to evaluate the prevalence and pattern of cervical lymph node metastasis in patients with supraglottic laryngeal carcinoma to inform neck management and guide treatment strategies.

Methods:

Study Setting and Duration: This research was designed as a cross-sectional study and was carried out in the Department of Otolaryngology and Head–Neck Surgery at Mymensingh Medical College over a period spanning from July 2024 to May 2025.

Study Population and Sample Size: All consecutively hospitalized patients having a diagnosis ofsupraglottic carcinoma at Mymensingh Medical College during the study period. Individuals of all ages and genders were deemed qualified. In the final analysis40 patients were included.

Inclusion Criteria: Individuals with a diagnosis of supraglottic carcinoma of the larynx were included regardless of their age or gender. Instances featuring cervical lymph node metastasis or those devoid of it, along with cases exhibiting direct tumor spread into the neck, were included.

Exclusion Criteria: Patients with supraglottic cancers aside fromsquamous cell carcinoma were excluded. Additionally, cases of glottic and subglottic carcinoma, as well as tumors originating in the piriform fossa extending into the supraglottic area were not included in the study.

Data Collection Procedure: Patients meeting the inclusion criteria were enrolled consecutively. Particular attention was given to the evaluation of cervical lymph nodes, encompassing their dimensions, anatomical position, side, and signs of metastatic involvement. All patients underwent indirect laryngoscopy, while fiber-optic laryngoscopy was used when necessary. Plain radiographs of the neck were obtained routinely, and advanced imaging modalities like CT scans or MRIs were performed selectively according to clinical indications. Direct laryngoscopy under general anesthesia was performed to confirm clinical findings, evaluate the extent of disease, and obtain biopsy specimens. Histopathological tissue was examination to confirm malignancy and determine tumor grade. Relevant clinical, radiological, and operative data were systematically recorded using a pre-structured data collection form.

Data Analysis: Collected data were reviewed for correctness and thoroughness before examination. The data were entered into a spreadsheet and analyzed using descriptive statistical methods. Frequency, percentage, mean, and SD were calculated for categorical and continuous variables. The results were presented in tables, charts, and graphs where appropriate to summarize clinical, radiological, and histopathological findings.

Ethical Considerations: Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Mymensingh Medical College. Consent was obtained from respondents before enrollment. Confidentiality and privacy of patient information were strictly ensured throughout the study period.

Results:

Among 40 patients with supraglottic carcinoma, the majority were males (90%) in the 50–60 years age group (47.5%), predominantly cultivators (40%) and from a lower socioeconomic class (67.5%), with smoking being the most common personal habit (67.5%). Most commonly “catch in throat” (82.5%), dysphagia (67.5%), and cough/irritation (65%), while neck swelling was observed in 40% of cases. Macroscopically, tumors were primarily fungating (50%), and the most commonly involved site was the aryepiglottic folds and arytenoids (50%). Cervical nodal metastasis was identified in 40% of the patients. The lymph nodes were involved at Level II (50%), followed by Level III (37.5%), with a predominance of homolateral nodal involvement (87.5%). The majority of metastatic nodes were detected at an early nodal stage, with N1 disease accounting for 62.5% of cases. Based on TNM classification, Stage II was the frequently observed (40%), followed by Stage III (25%). Histopathological evaluation revealed that well-differentiated squamous cell carcinoma was the predominant tumor type, comprising 57.5% of the cases. Overall, supraglottic carcinoma in this cohort primarily affected middle-aged males, presenting at early to intermediate stages with well-differentiated tumors most commonly involving the aryepiglottic folds and arytenoids.

Table 1 demonstrates that the highest proportion of respondent diagnosed were partto the 50–60-year age group (47.5%), followed by those aged 60–70 years (25%). This distribution suggests that supraglottic carcinoma predominantly affects individuals in middle to late adulthood.There was a marked male predominance, with 36 males (90%) and 4 females (10%), giving a male-to-female ratio of 9:1. Regarding occupation, most patients were cultivators (40%), followed by service holders (20%), suggesting a higher prevalence among manual laborers. The majority of patients (67.5%) were from a low socioeconomic background, whereas 30%

Table I

Demographic, Socioeconomic, and Personal Habit Characteristics of Patients with Supraglottic Carcinoma (n=40)

Variable	Category	Number of Patients	Percentage (%)
Age (years)	40–50	8	20
	50–60	19	47.5
	60–70	10	25
	70–80	2	5
	>80	1	2.5
Sex	Male	36	90
	Female	4	10
Occupation	Cultivator	16	40
	Service Holder	8	20
	Day Labour	5	12.5
	Businessman	4	10
	Housewife	4	10
	Salesman	2	5
	Hawker	1	2.5
Socioeconomic	Poor (monthly income < Tk. 5,000)	27	67.5
Status	Middle Class (Tk. 5,000–10,000)	12	30
	Affluent (> Tk. 10,000)	1	2.5
Personal Habit	Smoking	27	67.5
	Chewing betel/nuts	6	15
	Smoking, chewing & alcohol	2	5
	Smoking & alcohol	1	2.5
	Smoking & chewing tobacco	4	10

belonged to the middle socioeconomic group, and only a small fraction (2.5%) was from higher socioeconomic strata. Smoking was the most common personal habit (67.5%), followed by chewing betel/nuts (15%), highlighting smoking as the major risk factor. Overall, the findings indicate that supraglottic carcinoma predominantly affects middle-aged to mature men from disadvantaged socioeconomic backgrounds, with smoking and certain occupations being important contributing factors.

Figure 1 illustrates the occurrence of metastasis of cervical lymph nodesamong the study population. Of the 40 patients included, 16 (40%) showed evidence of regional nodal involvement, whereas the remaining 24 patients (60%) had no detectable cervical lymph node metastasis.

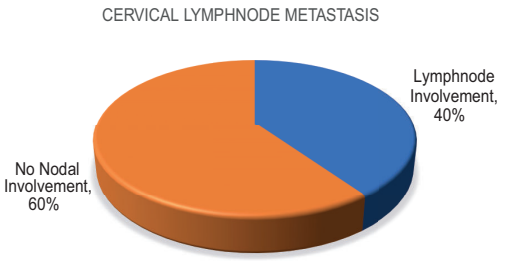

Figure 1: Occurrence of Cervical Lymph Node Metastasisin Supraglottic Carcinoma (n = 40)

Table II shows Most patients with supraglottic carcinoma presented with multiple symptoms, the commonest being "catch in throat" (82.5%), followed by dysphagia (67.5%) and cough/irritation (65.0%). Neck swelling was present in 40% of patients, most often on one side of the neck. Other presenting features were less common, including stridor in 15% of cases, hemoptysis in 5%, and weight loss in 25% of patients. Macroscopically, the majority of tumors were fungating (50%), followed by exophytic (30%) and ulcerative (20%) growths. The distribution of tumor sites shows that the aryepiglottic folds and arytenoids were the most frequently involved subsites, accounting for 50% of cases. This was followed by involvement of the epiglottis with the laryngeal vestibule in 30% of patients. Isolated involvement of the false cord was observed in 12% of cases, while the epiglottis alone was the least commonly affected site, seen in 7.5% of patients.Overall, the findings indicate that supraglottic carcinoma frequently presents with multiple symptoms, most commonly as a fungating growth affecting the aryepiglottic folds and arytenoids.

Table II

Clinical Features, Macroscopic Appearance, and Site of Involvement of Supraglottic Feature

Type	Feature / Appearance	n=40	%
Presenting Symptoms	Catch in throat	33	82.5
	Dysphagia	27	67.5
	Cough and irritation	26	65.0
	Foreign body sensation	20	50.0
	Change of voice	8	20.0
	Neck pain	7	17.5
	Neck swelling (n = 16)	Unilateral – 14 Bilateral – 2	40.0
	Stridor	6	15.0
	Hemoptysis	2	5.0
	Loss of weight	10	25.0
Macroscopic Appearance of Growth	Fungating	20	50.0
	Exophytic	12	30.0
	Ulcerative	8	20.0
Site of Involvement	Aryepiglottic folds & Arytenoids	20	50.0
	Epiglottis with vestibule	12	30.0
	False cord	5	12.0
	Epiglottis	3	7.5

Table III demonstrates that involvement of cervical lymph nodesin supraglottic carcinoma most frequently affected Level II nodes (50%), followed by Level III nodes (37.5%). The majority of metastatic lymph nodes were found at an early nodal stage, with N1 disease observed in 62.5% of cases and N2 disease in 25%. Nodal spread was predominantly homolateral (87.5%), with a slight predominance on the right side, while bilateral involvement of cervical lymph nodes was noted in 12.5% of patients.

Table IV summarizes the TNM staging and histological grading of supraglottic carcinoma among the 40 patients. Stage II was the most frequently observed (40%), followed by Stage III (25%), Stage I (20%), and Stage IV (15%), indicating that a majority of patients presented with early to intermediate stage disease. Tumors were squamous cell carcinoma, with the majority being well-differentiated (57.5%). Moderately differentiated tumors represented 30%, poorly differentiated tumors made up 7.5%, and undifferentiated tumors consisted of 5% of the cases.These findings suggest that supraglottic carcinoma in this cohort predominantly manifests as well-differentiated tumors at early to intermediate stages.

Table III

Involvement of Cervical Lymph Nodes in Supraglottic Carcinoma (n = 16)

Feature Type	Feature / Category	Number of Cases	Percentage (%)
Level of Lymph Node	Level I	0	0.0
Involvement	Level II	8	50.0
	Level III	6	37.5
	Level IV	2	12.5
	Level V	0	0.0
	Level VI	0	0.0
Status of Involved Node	N1	10	62.5
	N2	4	25.0
	N3	2	12.5
Laterality of Node	Homolateral (Right)	8	50.0
Involvement	Homolateral (Left)	6	37.5
	Bilateral	2	12.5

Table IV

Staging and Histological Grading of Supraglottic Carcinoma (n = 40)

Feature Type	Category / Grade	Number of Cases	Percentage (%)
TNM Staging	Stage I	8	20.0
	Stage II	16	40.0
	Stage III	10	25.0
	Stage IV	6	15.0
Histological Grading	Well differentiated	23	57.5
	Moderately differentiated	12	30.0
	Poorly differentiated	3	7.5
	Undifferentiated	2	5.0

Discussion:

In the present study, supraglottic carcinoma primarily affected individuals in the 50–60-year age group (47.5%), followed by those aged 60–70 years (25%), indicating a predominance in middle-aged to older adults. There was a marked male predominance, with males constituting 90% of cases, resulting in a male-to-female ratio of 9:1. Tobacco smoking was the The most frequent risk element(67.5%), followed by betel/nut chewing (15%). As 40% of patients were farmers and 20% were employed in service sectors, consistent with prior reports that exposure to dust, soot, and fumes raises the likelihood of laryngeal cancer[12,13]. Additionally, 67.5% of patients were from a low socioeconomic background, aligning with previous results that lower socioeconomic status is associated with higher incidence of laryngeal carcinoma [14].

Cervical lymph node metastasis was identified in 40% of patients, while 60% had no nodal involvement, consistent with global data indicating nodal metastasis rates of 40–55% in supraglottic carcinoma, increasing with tumor stage[9]. Clinically, the most common presenting symptoms were a sensation of a lump in the throat (82.5%), dysphagia (67.5%), and persistent cough or irritation (65%), with neck swelling observed in 40% of patients. These results align with earlier research indicating nonspecific symptoms in the upper aerodigestive tract the primary presentation of supraglottic tumors[15].

Macroscopically, tumors were predominantly fungating (50%), followed by exophytic (30%) and ulcerative (20%) types. The aryepiglottic folds and arytenoids were the most frequently involved subsites (50%), followed by the epiglottis with vestibule (30%), false cord (12%), and isolated epiglottis (7.5%), corroborating previous observations[16].

In our study, cervical lymph node metastasis in supraglottic carcinoma primarily involved Level II nodes (50%) and Level III nodes (37.5%), with Level IV involvement in 12.5%. Most nodes were early stage (N1 62.5%, N2 25%, N3 12.5%), and spread was mainly ipsilateral (87.5%), with bilateral involvement in 12.5% of cases. For comparison, Redaelli de Zinis et al. (2002) reported Level II involvement in 51%, Level III in 38%, Level IV in 11%, N1 ~60%, N2 ~25%, N3 ~10%, and bilateral nodal involvement in 12%, closely aligning with our findings [8]. Akuno reported that Level II and Level III nodes were the most frequently affected in laryngeal cancer, which supports our findings and confirms that Levels II–III are the most commonly affected, supporting selective ipsilateral neck dissection[17].

Most patients offered with early to mid-stage illness, with Stage II (40%) and Stage III (25%) being most common. All tumors were confirmed as squamous cell carcinoma, with well-differentiated tumors representing 57.5%, moderately differentiated 30%, poorly differentiated 7.5%, and undifferentiated 5% of cases. This distribution aligns with previous large-scale analyses reporting a predominance of early-stage, well- and moderately differentiated supraglottic carcinoma[12,16]. In summary, these results highlight the significance of prompt diagnosis, thorough assessment of cervical lymph nodes, and focused management approaches for individuals with supraglottic laryngeal carcinoma.

Conclusion:

Cervical metastasis to lymph nodes is common and clinically significant feature in patients with supraglottic carcinoma of the larynx, with Level II and Level III nodes most commonly involved. The majority of nodal metastases were detected at an early stage,

predominantly on the same side as the primary tumor, while bilateral involvement was relatively uncommon. Early to intermediate stage disease, and tumors were largely well-differentiated squamous cell carcinoma, emphasizing the importance of early detection and thorough nodal assessment in the management of supraglottic carcinoma. These findings underscore the need for careful evaluation of cervical lymph nodes during clinical and radiological assessment.Refining strategies for neck dissection, optimizing treatment planning, and improving patient outcomes are recommended for future research with more cohorts.

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