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# Tumour Characteristics and Histopathological Profile of Laryngeal Carcinoma Patients in DMC

Ashraful Islam[1], Rahat Tanvir Anwar[2], Rezaul Karim[3], Rifat Hassan[4], Mahbobul Haque[5], Fahmida Farhana Khan[6*]

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*Corresponding author

## ABSTRACT

**Background:** Laryngeal cancer predominantly impacts elderly men and is closely linked to the consumption of tobacco and alcohol. Cervical lymph node metastasis serves as a significant prognostic indicator associated with tumor stage, size, invasion, and differentiation, and it can happen even in cases that appear clinically node-negative. Restricted local data require additional identification of predictive elements for enhanced management. **Methods & Materials:** This cross-sectional study conducted at Dhaka Medical College Hospital from January –December 2019, involved 50 patients with histopathologically confirmed laryngeal carcinoma chosen purposefully. Tumor characteristics and histopathological grading were evaluated through clinical, radiological, and biopsy information. Analysis utilized SPSS v25 along with the Chi-square test ($p < 0.05$ significant), and ethical approval along with informed consent was secured. **Results:** In a study of 50 patients with laryngeal carcinoma, the majority of tumours exceeded 1 cm (74.0%) and 3 cm in thickness (58.0%), with the supraglottis being the most frequently affected area (68.0%) and moderately differentiated squamous cell carcinoma being the most common histological type (62.0%). Cervical lymph node metastasis was observed in 48.0% of instances. Tumour size, thickness, and histopathological grade showed a significant correlation with nodal metastasis ($p \leq 0.0001$), with a greater occurrence in larger, thicker, and poorly differentiated tumours. **Conclusion:** Tumour dimensions, thickness, and histopathological grade are critical indicators of cervical lymph node metastasis in laryngeal carcinoma and are vital for proper staging and treatment.

***Keywords:*** *Tumour Characteristics, Histopathological Profile, Laryngeal Carcinoma.*

1. *Assistant Registrar, Department of Otolaryngology & Head Neck Surgery, National Institute of ENT, Tejgaon, Dhaka, Bangladesh (ORCID: 0009-0001-0387-8797)*
2. *Assistant Registrar, Department of Otolaryngology & Head Neck Surgery, National Institute of ENT, Tejgaon, Dhaka, Bangladesh (ORCID: 0009-0005-7659-1710)*
3. *Research Officer, Department of Otolaryngology & Head Neck Surgery,National Institute of ENT, Tejgaon, Dhaka, Bangladesh (ORCID: 0009-0005-6173-618X)*
4. *Assistant Professor, Department of Otolaryngology & Head Neck Surgery, National Institute of ENT, Tejgaon, Dhaka, Bangladesh (ORCID: 0009-0004-6614-8021)*
5. *Assistant Professor, Department of ENT, General Hospital, Faridpur, Bangladesh Attachment -National Institute of ENT, Tejgaon, Dhaka, Bangladesh (ORCID: 0009-0004-8671-0974)*
6. *Medical Officer, Department of Radiation Oncology, National Institute of Cencer Research & Hospital, Mohakhali, Dhaka, Bangladesh (ORCID: 0009-0003-0334-1257)*

## INTRODUCTION

Laryngeal cancer is the most prevalent cancer of the head and neck globally and is the 11th most frequent cancer among men. It primarily impacts males (approximately 78%) and is most commonly identified in the 60s and 70s [1,2]. This cancer is primarily squamous cell carcinoma (≈90–95%), closely associated with tobacco and alcohol consumption, which work together to elevate risk. Its behavior varies by subsite: supraglottic tumors spread earlier because of abundant lymphatic drainage, whereas glottic tumors are frequently identified sooner due to voice alterations and exhibit reduced early nodal spread due to restricted lymphatics [3,4].

Cervical lymph node metastasis serves as an important indicator of disease advancement in laryngeal carcinoma and is associated with increased recurrence, distant metastasis, and reduced survival rates. Recognizing indicators of nodal involvement is essential for precise staging and treatment strategy development [5,6]. Advanced T-stage (T3–T4) laryngeal tumors present a higher likelihood of metastasizing to cervical lymph nodes compared to early-stage lesions, attributed to their increased size and local invasion. Greater invasion depth also forecasts nodal involvement, as deeper tumors have a higher likelihood of penetrating lymphovascular structures and disseminating to cervical nodes [7,8].

Tumors with poor differentiation exhibit increased cervical nodal metastasis because of their heightened biological aggressiveness. Lymphovascular invasion is a significant indicator of nodal metastasis, suggesting the presence of established routes of dissemination. Perineural invasion is linked to more aggressive disease and might heighten the risk of regional spread [9,10]. CT, MRI, and PET-CT serve as essential methods for preoperative staging, with characteristics such as lymph node enlargement, necrosis, and extracapsular extension suggesting metastasis. Ultrasound-guided FNAC is an exceptionally sensitive and frequently employed technique to verify metastasis in cervical lymph nodes [11,12].

Research indicates that hidden cervical lymph node metastasis in laryngeal cancer is frequent among cN0 patients and adversely impacts prognosis, frequently justifying elective neck therapy. In initial-stage (T1–T2) supraglottic tumors, hidden nodal disease is common and associated with worse results, emphasizing the importance of thorough neck assessment and treatment [13,14].

A study in Bangladesh reported that supraglottic laryngeal carcinoma exhibited the highest cervical lymph node metastasis, while glottic tumors showed the lowest. Lymph node involvement rose with later stages and was more widespread in advanced disease [15].

Information regarding the factors predicting cervical lymph node metastasis in laryngeal cancer is scarce in Bangladesh and primarily descriptive, lacking strong multivariate analysis. Local elements like

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delayed presentation and elevated tobacco consumption might influence disease patterns. The objective of this study is to determine clinicopathological factors that predict cervical lymph node metastasis to enhance risk assessment and inform management strategies.

## METHODS & MATERIALS

This cross-sectional study was carried out in the Department of Otolaryngology–Head and Neck Surgery at Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh over an one year period from 1st January 2019 to 31st December 2019 to evaluate tumour characteristics and histopathological patterns of laryngeal carcinoma patients.

Patients diagnosed with laryngeal carcinoma attending the study department during the specified period constituted the study population. A total of 50 cases with histopathologically confirmed laryngeal carcinoma were included. Subjects were recruited through purposive sampling based on eligibility criteria. Individuals of either sex with confirmed diagnosis who provided informed written consent were included, whereas patients with recurrent tumours, metastatic lesions involving the larynx, critically ill conditions preventing participation, or refusal to consent were excluded from the study.

Data were collected using a structured, predesigned data collection instrument. Information was obtained through direct patient interviews and review of relevant medical records. Tumour-related variables such as size, thickness, anatomical location, and cervical lymph node involvement were assessed through clinical examination, endoscopic evaluation, radiological reports, and available investigations. Histopathological classification was based on biopsy findings and categorized into well differentiated, moderately differentiated, and poorly differentiated squamous cell carcinoma.

All collected data were carefully reviewed, coded, and analyzed using Statistical Package for Social Sciences (SPSS) version 25.0. Categorical variables were summarized using frequencies and percentages, while associations between variables were tested using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

Ethical clearance was obtained from the relevant institutional authority prior to commencement of the study. Written informed consent was taken from all participants, and strict confidentiality and anonymity were maintained throughout the research process.

## RESULTS

### Tumour Morphological Characteristics

*Table I* presents the morphological characteristics of laryngeal carcinoma among the study patients. The majority of tumours were larger than 1 cm in size, accounting for 74.0% of cases, while 26.0% of tumours measured less than 1 cm. Regarding tumour thickness, more than half of the lesions (58.0%) had a thickness greater than 3 cm, whereas 42.0% showed a thickness of less than 3 cm. These findings indicate that most patients presented with relatively large and locally advanced tumours at the time of diagnosis.

**Table I**
Morphological characteristics of the tumour (*n*=50).

| Variable | Frequency | Percentage (%) |
|---|---|---|
| Tumour size | | |
| <1 cm | 13 | 26.0 |
| >1 cm | 37 | 74.0 |
| Tumour thickness | | |
| <3 cm | 21 | 42.0 |
| >3 cm | 29 | 58.0 |

### Anatomical Distribution of Tumour

*Table II* shows the anatomical distribution of laryngeal carcinoma. The supraglottic region was the most commonly affected site (68.0%), followed by the glottic region (32.0%). No cases of isolated subglottic carcinoma were observed.

**Table II**
Anatomical distribution of laryngeal carcinoma (*n*=50).

| Tumour Site | Frequency | Percentage (%) |
|---|---|---|
| Supraglottis | 34 | 68.0 |
| Glottis | 16 | 32.0 |
| Total | 50 | 100.0 |

### Histopathological Profile

*Table III* demonstrates that moderately differentiated squamous cell carcinoma was the most common histological type (62.0%), followed by well differentiated (34.0%) and poorly differentiated carcinoma (4.0%). This indicates a predominance of intermediate-grade malignancy.

**Table III**
Histopathological grading of tumour (*n*=50).

| Histological Grade | Frequency | Percentage (%) |
|---|---|---|
| Well differentiated SCC | 17 | 34.0 |
| Moderately differentiated SCC | 31 | 62.0 |
| Poorly differentiated SCC | 2 | 4.0 |
| Total | 50 | 100.0 |

### Cervical Lymph Node Metastasis

*Figure 1* presents that out of 50 patients, 48.0% demonstrated positive cervical lymph node metastasis, while 52.0% had no evidence of nodal involvement at the time of evaluation.

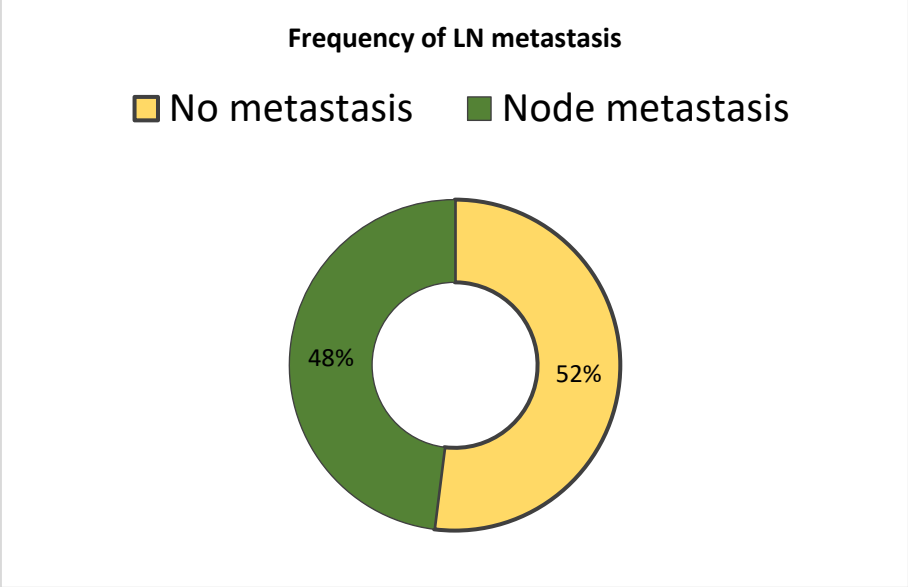


**Figure-I: Frequency of cervical lymph node metastasis (*n*=50)**

**Tumour and histopathology vs lymph node metastasis**

*Table IV* shows histopathological grade showed a statistically significant association with lymph node involvement (p = 0.0001), with higher rates of metastasis observed in poorly differentiated tumours. Tumour size was also significantly associated with nodal metastasis (p < 0.0001), with patients having tumours larger than 1 cm demonstrating higher lymph node positivity compared to those with smaller tumours. Similarly, tumour thickness was significantly associated with cervical lymph node metastasis (p = 0.0001), with increased nodal involvement observed in tumours measuring more than 3 cm in thickness.

**Table IV**

Association of tumour characteristics and histopathological grade with cervical lymph node metastasis in laryngeal carcinoma patients (*n* = 50).

| Variables | Total (n=50) | LN Positive (n=24) n (%) | LN Negative (n=26) n (%) | p-value |
|---|---|---|---|---|
| Histological Grade | | | | |
| Well differentiated | 17 | 5 (29.4) | 12 (70.6) | 0.0001* |
| Moderately differentiated | 31 | 17 (54.8) | 14 (45.2) | |
| Poorly differentiated | 2 | 2 (100.0) | 0 (0.0) | |
| Tumour size | | | | |
| <1 cm | 13 | 2 (15.4) | 11 (84.6) | <0.0001* |
| >1 cm | 37 | 22 (59.5) | 15 (40.5) | |
| Tumour thickness | | | | |
| <3 cm | 21 | 7 (33.3) | 14 (66.7) | 0.0001* |
| >3 cm | 29 | 17 (58.6) | 12 (41.4) | |

**Statistically significant at p < 0.05*

Overall, the findings suggest that tumour-related pathological factors such as size, thickness, and histological grade are significant predictors of cervical lymph node metastasis in laryngeal carcinoma, whereas demographic variables are not significantly associated.

## DISCUSSION

In this study, the majority of patients presented with tumours exceeding 1 cm and a tumour thickness greater than 3 cm, suggesting advanced local disease upon presentation. In laryngeal carcinoma, increased tumour size is recognized as a significant prognostic indicator linked to worse clinical results and lower survival rates. Consequently, the prevalence of larger tumors in this research may indicate late diagnosis and advancement of the disease. Likewise, greater tumour thickness indicates a higher tumour load and localized invasion [16]. These results highlight the significance of prompt identification and timely intervention to enhance treatment results in individuals with laryngeal cancer.

In the current study, the supraglottis was identified as the predominant location for laryngeal carcinoma, with the glottis coming next. An earlier study indicated that the supraglottic area possesses abundant lymphatic drainage and anatomical routes that aid in tumor dissemination, while glottic tumors are typically identified sooner because of symptoms like hoarseness [17]. This could clarify the prevalence of supraglottic tumors noted in our research.

In this study, moderately differentiated squamous cell carcinoma was found to be the most prevalent histological grade, with well differentiated carcinoma and poorly differentiated carcinoma following. An earlier study indicated that the majority of laryngeal and hypopharyngeal cancers were squamous cell carcinomas with a tendency towards moderate differentiation [18]. The results of the current study align with this observation.

In this study, cervical lymph node metastasis was noted in 48.0% of patients, whereas 52.0% showed no nodal involvement. An earlier study indicated that cervical lymph node metastasis may happen in clinically node-negative (cN0) laryngeal carcinoma, revealing a considerable risk of hidden metastasis [19]. The current results align with this

observation, emphasizing the significance of thorough neck evaluation in management.

In the current research, cervical lymph node metastasis showed a significant correlation with histopathological grade, tumor size, and tumor thickness. Poorly differentiated tumours exhibited the highest rate of nodal positivity, with moderately differentiated tumours at 54.8%, and well differentiated tumours at 29.4%. In the same way, tumours larger than 1 cm and those exceeding 3 cm in thickness showed notably increased lymph node involvement. These results suggest that larger tumour size, greater thickness, and lower differentiation are significant indicators of cervical lymph node metastasis. Earlier research indicates that larger and more advanced laryngeal cancers are linked to increased rates of regional metastasis and worse outcomes [16-19]. The anatomical design of the larynx and patterns of tumor invasion additionally facilitates lymphatic spread. These factors play a crucial role in anticipating nodal metastasis and informing treatment strategies.

In laryngeal carcinoma, tumour size, thickness, histological grade, and cervical lymph node status are crucial prognostic factors that must be thoroughly evaluated for staging and treatment to enhance clinical results.

## CONCLUSION

In this study, laryngeal carcinoma mainly appeared as moderately differentiated, supraglottic, and locally advanced tumors. Cervical lymph node metastasis was closely linked to tumour dimensions, thickness, and histopathological grading. These factors related to tumors are crucial indicators of nodal involvement and must be thoroughly evaluated for precise staging, prognosis, and effective treatment planning.

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