

## Pattern of Regional Metastases in Laryngeal Carcinoma

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### Abstract

**Background:** Regional metastases to the cervical lymph node is common in laryngeal carcinoma and this is also the most important prognostic factor of the disease. **Objective:** The purpose of the present study was to see the frequency of cervical metastases related to the sites of laryngeal carcinoma and also to see the relation between primary site and level of metastatic node as well as the relation between T and N stage of the tumour. **Methodology:** This cross sectional study was done in the Department of Otolaryngology and Head-Neck Surgery at Bangabandhu Sheikh Mujib Medical University, Dhaka and Specialized ENT Hospital of SAHIC, Dhaka from April 2009 to March 2010. A total number of 50 patients who were histopathologically proven laryngeal carcinoma at any age with both sexes were included in this study. General physical examination and ENT examination was done thoroughly. Direct laryngoscopy was done under general anaesthesia to assess the site, size, and extension of the tumour as well as for staging and biopsy. **Results:** A total number of 60% laryngeal carcinoma patients presented with regional metastases to the cervical nodes. Highest cases among laryngeal carcinoma were supraglottic carcinoma (72.0%) which also showed the highest rate of lymph node metastases (72.2%). Most frequently involved levels of the neck were level II (56.7%) and level III (33.3%). It was also observed that the rate of regional metastases was increasing with the advancing T-stage of the disease. **Conclusion:** Regional metastases is a useful prognostic indicator of the laryngeal carcinoma. So, early detection of the disease has a great importance on the management of the disease.

**Key words:** Laryngeal carcinoma, lymph node, regional metastases

### Introduction

Larynx is the most common site for primary malignant tumour in head and neck region<sup>1</sup>. A study in Bangladesh revealed that 35.32% of all body cancers were in head and neck region and the commonest one was laryngeal carcinoma<sup>2</sup>.

Regional metastases to the cervical lymph nodes is the most important prognostic factor of laryngeal carcinoma<sup>3</sup>. The number and size of involved nodes, extracapsular spread and nodal fixation have been suggested as the important characteristics of the metastatic lymph nodes<sup>4,5,6</sup>. A 5 year survival rate in patients with cervical metastases decreases with the increasing number and level of involved nodes as well as with the presence of capsular rupture<sup>7</sup>. A single ipsilateral cervical lymph node metastases decreases the survival by 50% than the patients without metastases. Nodal metastases is also associated with high rate of regional recurrence<sup>8</sup>. The site of laryngeal carcinoma is also an important initial prognostic factor because it comprises the possible way of expansion of primary tumour and the modality of metastasising<sup>9</sup>. The tumour location within the

larynx was found to be significantly associated with the regional metastases<sup>3</sup>.

The highest incidence of malignant cervical lymph node is associated with supraglottic tumour compared to glottic and subglottic carcinoma of larynx<sup>3</sup>. The frequency distribution of supraglottic and glottic carcinoma has got wide geographical variation<sup>10</sup>. In Indian<sup>11</sup> subcontinent, supraglottic area is the commonest site of origin which is about 57% and in UK<sup>10</sup> it is about 40%. On the other hand Glottis is the commonest site in North America (60%) and France (61%)<sup>12</sup>. Subglottic carcinoma is rare and least frequent type all over the world with a 5% or less in different series<sup>12, 13</sup>. Like Indian subcontinent, supraglottic carcinoma is the top among the laryngeal carcinomas in Bangladesh<sup>7</sup>. In two different previous studies in Bangladesh, supraglottic cancer was found in 67%<sup>7</sup>, and 70%<sup>14</sup> cases. Since the chance of regional metastases is more in supraglottic carcinoma and it is the commonest among the laryngeal carcinomas in Bangladesh, metastatic lymph nodes in laryngeal carcinoma is also common in Bangladesh.

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This study was designed to evaluate the levels of involved neck nodes in association with the primary site of laryngeal carcinoma as well as the relation between T and N stage of the disease. These informations are useful while planning for treatment strategies.

**Methodology**

This cross sectional study was carried out at Department of Otolaryngology and Head Neck surgery of Bangabandhu Sheikh Mujib Medical University, and Specialized ENT Hospital of SAHIC, Dhaka from April 2009 to March 2010. All histologically proven laryngeal carcinoma at any age with both sexes were included in this study. Laryngeal malignancy other than carcinoma were excluded. Ethical approval was given by Bangladesh College of Physicians and Surgeons. General physical examination and ENT examination was done thoroughly. Neck was examined carefully to confirm the lymph node involvement or any direct extension of primary tumour to the neck. To assess the tumour, indirect laryngoscopy was done in all cases and fiber optic laryngoscopy was done where needed. CT scan of neck was done in some cases to confirm the staging. Preoperative investigations for general anaesthesia was done in all cases. Direct laryngoscopy was done under general anaesthesia to assess the site, size, and extension of the tumour as well as for staging and biopsy. At the same time, Neck was palpated again under general anaesthesia for better assessment. Tissue from the primary site was sent for histopathological study to confirm the tissue diagnosis. Data were collected by detailed history. All these data were compiled in a prescribed data collection sheet. The data were analyzed by SPSS 17.0 and are presented in the form of tables and diagrams.

**Results**

A total number of 50 cases laryngeal carcinoma were included in this study. Among 36 supraglottis cases, 26 (72.2%) cases showed metastasis. Out of 13 glottis cases, metastasis was found in 4 (30.8%) cases (Table1)

**Table 1: Site of laryngeal involvement and distribution of lymph nodes**

Site of Node	Number of cases	Cases with metastasis
Supraglottis	36 (72.0%)	26 (72.2%)
Glottis	13 (26.0%)	4 (30.8%)
Subglottis	1 (2.0%)	0 (0.0%)
<b>Total</b>	<b>50(100.0%)</b>	<b>30(100.0%)</b>

There was 17 (56.7%) cases presented with level-II neck nodes involvement. Next to this was level-III which was 7(25.0%) cases (Table 2). N0 was found 20(40.0%) cases followed by N1 and N2 which were 15(30.0%) cases and 13(26.0%) cases respectively (Table 3).

In stage T<sup>1</sup>, the involvement of neck nodes was 14.3%

cases. However stage T<sup>2</sup>, stage T<sup>3</sup> and stage T<sup>4</sup> were 41.2%, 81.8% and 100.0% respectively.

**Table 2: Levels of metastetic neck node involvement**

Levels of neck nodes	Frequency	Percentage
Level- II	17	56.7
Level- III	7	25.0
Level-IV	2	6.6
Level- II + III	2	6.7
Level- III+ IV	1	3.3
Level- III+ IV+V	1	3.3

**Discussion**

Metastases is the most important factor that can affect the prognosis of patients with head and neck carcinoma<sup>15</sup>. The 5 year survival rate of patients with lymph node metastases is 50% lower than that of the patients without metastases<sup>8</sup>. Considering these facts this study was carried out to evaluate the details of cervical metastases in patients with laryngeal carcinoma. Palpation is still the basic method for finding whether metastases exists in the lymph nodes<sup>15</sup>. Radiological examinations are not very reliable<sup>16</sup>. Fienmesser et al<sup>17</sup> found that CT scanning is not superior to palpation and Wenjue et al<sup>15</sup> agreed to this view. So, in this study it has been also assessed the node by proper neck palpation, at first as a part of ENT examination and then under general anaesthesia during the direct laryngoscopy.

**Table 3: Status of involved neck nodes (n=50)**

Status of Neck node	Frequency	Percentage
N0	20	40.0
N1	15	30.0
N2	13	26.0
N3	2	4.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

In this study out of 50 patients with laryngeal carcinoma, 30 presented with metastatic neck node (60%). Kirchner et al<sup>14</sup> showed that 42.8% patients presented with palpable neck node in their study. In fact, rate of neck node metastases can vary in different studies. As supraglottic carcinoma is more common in Bangladesh and chance of lymph node metastases is more in this variety, the rate of neck node metastases in laryngeal carcinoma is also more here. Furthermore, patients turn up late in this country which may also increase the rate of neck node metastases.

**Table 4: Relation between T stage of laryngeal carcinoma and Metastatic node**

Stage of tumour	Number of cases	Involved neck nodes	Metastatic rate
Stage T <sup>1</sup>	7	1	14.3%
Stage T <sup>2</sup>	17	7	41.2%
Stage T <sup>3</sup>	22	18	81.8%
Stage T <sup>4</sup>	4	4	100%

It is well known that supraglottis is the commonest site of laryngeal carcinoma in subcontinent<sup>3,7,11</sup>. The result of this study also coincides with this fact. Here 72% patients presented with supraglottic carcinoma, 26% with glottic and 2% with subglottic carcinoma. Supraglottic carcinoma is characterized by higher prevalence of regional metastases compared with carcinoma of other laryngeal sites<sup>17,18</sup>. In this study 26(72.2%) out of 36 supraglottic cases presented with metastatic neck node. On the other hand, only 4(30.7%) patients among the 13 glottic carcinoma cases presented with neck node. No neck node was found in the only case of subglottic carcinoma. This result goes in line with the study done by Kirchner et al<sup>4</sup> where 65% supraglottic tumour had cervical metastases and 25% glottic tumour and none of the subglottic tumour had cervical metastases.

Regarding the level of neck involvement, supraglottic larynx drains mainly to upper deep cervical nodes - level II and level III. But in palpable neck diseases, all 5 levels can be involved<sup>12</sup>. In this present study, level II nodes were involved in 16 out of 30 cases (53.3%), followed by level III where 7 out of 30 cases (25%) involved. Level IV involved in 2(6.67%) patients. No patient had isolated level I involvement in this study and level V was involved in one patient where multiple levels were involved. Overall 5 patients presented with multiple levels involvement and all 5 had supraglottic carcinoma.

These findings correlate with other international studies. In one study in Italy Luka et al<sup>18</sup> showed that level II and III were most frequently affected node in laryngeal cancer with a prevalence of 82% and 41% respectively. In that study it has been also observed that isolated metastases were found only at level II and III.

TNM staging was done in all patients. Out of 50 patients, 7(14.0%) patients presented with T<sup>1</sup> stage, 17(34.0%) patients in T<sup>2</sup> stage, 22(44.0%) patients in T<sup>3</sup> and only 4(8.0%) patients in T<sup>4</sup> stage. Regarding neck node staging, 20(40.0%) patients presented without palpable neck node which means N0. Among the neck node positive patients, 15(30.0%) presented as N1, 13(26.0%) as N2 and only 2(4.0%) patients presented as N3. No patient was found with distant metastases, so all were M0. These features are also similar to some extent with the study of Wenjue et al<sup>15</sup>, where 6.0% patients presented as T<sup>1</sup>, 31.0% as T<sup>2</sup>, 38.0% as T<sup>3</sup> and 25.0% as T<sup>4</sup>. Relation between T stage of laryngeal carcinoma and neck node metastases was also evaluated in this study. The metastatic rate according to the T stage of the disease reflects that the frequency of lymph node metastases increased with the advancing T stage of the laryngeal carcinoma. Metastatic rate at T<sup>1</sup> was 14.3%, at T<sup>2</sup> it was 41.2%, at T<sup>3</sup> 81.8% and at T<sup>4</sup> it was 100.0%.

### Conclusion

Metastasis to the regional lymph node is a very useful prognostic indicator of the laryngeal carcinoma. Therefore early detection of regional metastases is important of regarding the management of the disease.

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