

Original Article

Pattern of Neck Node Metastasis in Laryngeal Carcinoma

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Abstract

Background: Cancer continues to be a major health problem despite advances in medical technology for its diagnosis and treatment. Cancer of the larynx is the eleventh most common cancer in the world. Carcinoma larynx is a multifactorial disease. Smoking, betel-nut, betel-leaf chewing habit and drinking alcohol are the most important factors associated with carcinoma larynx.

Objective: To detect the rate and level of cervical lymph node metastasis in laryngeal carcinoma.

Methods: Detailed information was obtained in each cases according to protocol. Complete history was taken from accompanying attendants. Thorough clinical examination was done. All the information's were recorded in the fixed protocol. Patients were randomly assigned to one of three groups by card sampling. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using updated computerized program SPSS-19.

Results: Out of 50 cases the mean average age was found 58.5 ± 11.9 years with range from 39 to 78 years. Majority (70.0%) patients presented with supraglottic carcinoma followed by 13(26.0%) glottic carcinoma and 2(4.0%) subglottic carcinoma. More than three fourth (78.0%) patients had difficulty in swallowing followed by 17(34.0%) had hoarseness of voice, 12(24.0%) had discomfort in throat, 10(20.0%) had earache, 6(12.0%) had hemoptysis and 4(8.0%) had cough. Majority (42.0%) patients were found N_0 followed by 15(30.0%) N_1 , 13(26.0%) N_2 and 1(2.0%) N_3 of neck node. Majority (42.0%) patients was found in stage T3 followed by 7(14.0%) in stage T1, 18(36.0%) in stage T2 and 4(8.0%) in stage T4. Majority (56.0%) patients was found in level-II of neck nodes followed by 12(24.0%) level III, 4(8.0%) level IV, 3(6.0%) level II+III, 2(4.0%) level III+IV and 1(2.0%) level III+IV+V of neck nodes.

Conclusion: Laryngeal carcinoma is a common clinical entity in otolaryngology practice. Male were more predominant and the highest age group was 51-60 years. In our study most common Laryngeal carcinoma was supraglottic in nature. T3 was the commonest stage of involvement. Common clinical presentation was difficulty in swallowing and hoarseness of voice. N_0 and N_1 was the most common pattern of neck node metastasis. In our series majority of them were in level II.

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Introduction

Laryngeal carcinoma is the most common head and neck cancer worldwide¹. It constitutes 0.2% to 1.3% among all malignancies². In UK it has an incidence of 2.9 per 10,000 people³. Laryngeal cancer is more common in male than in women.³

About 40% of all laryngeal cancer in UK and 30% in north America are supraglottic. Conversely in North America 60% laryngeal carcinoma are glottic and in France it is about 61%.⁴

But in our subcontinent supraglottic carcinoma outnumbers glottic carcinoma. In India supraglottic carcinoma is about 57%, glottic carcinoma 39%, subglottic carcinoma is only about 6%.²

In Bangladeshi study it is found that out of 50 histopathologically proven laryngeal carcinoma 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%).⁵

Smoking, alcohol consumption, chewing tobacco, genetic factors, occupational factors, vitamin deficiency is the well known causative factors of laryngeal carcinoma.⁶ Male are predominant and common age of presentation over 40 years.⁴

Laryngeal carcinoma has high rate of cure in certain sub sites and early stage, may reach over 85% and overall exceeds 50%. Most of the failures in the treatment of laryngeal cancer are due to the delay in diagnosis can contribute to the presentation with later stage diseases and difficulty in eradicating the loco regional disease.⁷

A common phenomenon to all malignancy is their ability to metastasize. Patho-

physiology of this phenomenon has been the subject of much research & investigation.^{2,8}

Some tumours have the propensity to extensive local invasion without metastasis, whereas others metastasize early in their development.^{3,9}

With the exception of distant metastasis, the presence of cervical lymph node metastasis is the single most adverse independent prognostic factor in laryngeal carcinoma.^{4,10}

The highest incidence of cervical lymph node metastasis is associated with supraglottic carcinoma in comparison to glottic and subglottic carcinoma. Cases with bilateral neck nodes are uncommon. Supraglottic larynx is one of the most common primary site for bilateral neck nodes metastasis.^{3,11}

A single ipsilateral cervical lymph node metastasis decreases survival by 50% than that of the patients without metastasis. Nodal metastasis are also associated with a high rate of regional recurrence.¹²

So, early treatment of the primary tumour as well as lymph nodes is essential for good locoregional control & reduction of distant metastasis & improved survival.

Historically, case can be identified by taking comprehensive history & detail clinical examination. However, further evaluation by fine needle aspiration cytology (FNAC), imaging studies, endoscopy & biopsy is required for confirmative diagnosis and effective management.

This prospective study is designed to find out the pattern of neck node metastasis associated with laryngeal carcinoma and their clinical staging. Laryngeal cancer like all other head and neck cancer are best

treated by multidisciplinary approach. Neck node metastasis dictates clinical staging and treatment of the disease. Selective neck dissection is commonly performed for the management of the node negative patients. Positive neck node disease is also treated by comprehensive neck dissection. The major goal of the treatment of cancer of the larynx is to maximize the cure rate while neck dissection ensures survivality and better prognosis of the patients.

Methodology

The prospective cross-sectional clinical study was carried out in the Department of ENT and Head Neck Surgery, Combined Military Hospital, Dhaka from March 2016 to September 2016. All patients of diagnosed as laryngeal carcinoma with neck metastasis were taken as sampling population. Patients/attendance was briefed about the study and consent was taken. Brief history was taken included with symptoms and risk factors. Relevant physical examination, 12 lead ECG was done on admission and routinely thereafter. Blood glucose level ≤ 11.0 mmol/l or 198 mg/dl was considered as admission hyperglycemia. Baseline investigations including-cardiac biomarkers, serum creatinine, lipid profile and echocardiography were done for each patient. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using updated computerized program SPSS-19.

Result

The mean age was found 58.5 ± 11.9 years with range from 39 to 78 years. Male were found 39(78.0%) and female were 11(22.0%). Male female ratio was 3.5:1.

Table I

Distribution of the study patients with neck node metastasis according to site of laryngel involvement (n=50)

Site of laryngel involvement	Frequency	Percentage
Supraglottis	35	70.0
Glottis	13	26.0
Subglottis	02	04.0

Majority (70.0%) patients presented with supraglottic carcinoma followed by 13(26.0%) glottic carcinoma and 2(4.0%) subglottic carcinoma (Table-I)

Table II

Distribution of the study patients according to presenting complaints (n=50)

Presenting complaints	Frequency	Percentage
Difficulty in swallowing	39	78.0
Hoarseness of voice	17	34.0
Discomfort in throat	12	24.0
Earache	10	20.0
Hemoptysis	06	12.0
Cough	04	08.0
Stridor	03	06.0

More than three fourth (78.0%) patients had difficulty in swallowing followed by 17(34.0%) had hoarseness of voice, 12(24.0%) had discomfort in throat, 10(20.0%) had earache, 6(12.0%) had hemoptysis, 4(8.0%) had cough and 03(06.0%) had stridor (Table-II).

Table III

Distribution of the study patients according to primary tumour (n=50)

Site of laryngel involvement	Stage of primary tumor	Percentage
Supraglottic (n=35)		
T1	05	14.29
T2	13	37.14
T3	14	40.00
T4	03	8.57
Glottic (n=13)		
T1	03	23.08
T2	04	30.77
T3	05	38.46
T4	01	7.69
Subglottic (n=2)		
T1	00	0.0
T2	01	50.0
T3	01	50.0
T4	00	0.0

Out of 35 Supraglottic common primary tumor was T3 14(40%), T2 was 13(37.14%), T1 was 05(14.29%). Out of 13 Glottic, among them majority was found T3 which was 05(38.46%), T2 was found 04(30.77%), T1 was 03(23.08%) and T4 was 1(7.69%). Two patients was found subglottic, among 01(50%) was T2 and 01(50%) was T3 (Table-III).

Table IV

Distribution of the study patients according to status of neck nodes involvement (n=50)

Site of laryngel involvement	No. of status of neck node	Percentage
Supraglottic (n=35)		
N ₀	07	20.00
N1	15	42.86
N2	12	34.29
N3	01	02.86
Glottic (n=13)		
N ₀	11	84.62
N1	02	15.38
N2	00	0.00
N3	00	0.00
Subglottic (n=2)		
N ₀	01	50.0
N1	01	50.0
N2	00	00
N3	00	00

Majority 35 patients had supraglottic carcinoma among them 15(42.86%) had N1. Thirteen patients had glottic carcinoma among them 11(84.62%) had N₀. Two patients had subglottic carcinoma among them 1(50.0%) had N0 and 1(50.0%) had N1 (Table-IV).

Table V

Distribution of the study patients according to levels of neck node involvement (n=50)

Levels of neck node	Right side n(%)	Left side n(%)	Total
Supraglottic (n=35)			
Level II	13(35.14)	03(23.08)	16
Level III	05(13.51)	04(30.77)	09
Level IV	05(13.51)	02(15.38)	07
Level VI	02(5.41)	01(7.69)	03
Glottic (n=13)			
Level III	05(13.51)	02(15.38)	07
Level IV	04(10.81)	01(7.69)	05
Level VI	01(2.70)	00	01
Subglottic (n=2)			
Level IV	01(2.70)	00	01
Level VI	01(2.70)	00	01

Out of 35 supraglottic, among them majority (35.14%) patients was found in level II of neck nodes in right side and 23.08% was found left side, 13.51% level III of neck node was found in right side and 30.77% was found in left side. Five (13.51%) level IV of neck node was found in right side and 15.38% in left side. Out of 13 glottis, among them 05(13.51%) level III neck node was found in right side and 02(15.38%) was found in left side. Two patients had found subglottic level IV and level VI both are right side (Table-V).

Table VI
Distribution of the study patients according to tumor stage (n=50)

Stage of tumor	Frequency	Percentage
Stage I	07	14.0
Stage II	18	36.0
Stage III	21	42.0
Stage IV	04	8.0

Majority (42.0%) patients was found in stage III followed by 18(36.0%) in stage II, 7(14.0%) in stage I and 4(8.0%) in stage IV (Table-VI).

Discussion

This prospective clinical study was performed in 50 patients having carcinoma of larynx with cervical neck node metastasis in the Department of ENT and Head Neck Surgery, Combined Military Hospital, Dhaka.

In this current study it was observed that majority (70.0%) patients presented with supraglottic carcinoma followed by 13(26.0%) glottic carcinoma and 2(4.0%) subglottic carcinoma. In study of Koirala and Sharma¹³ Supraglottic larynx was the commonest subsite in 36/46 (78.2%), followed by glottis and subglottis respectively. Akmansu et al.¹⁴ have reported the incidence of supraglottic cancer to be 73.9%, followed

by 13% transglottic and 13% glottic in laryngeal cancers in Turkish population. Similarly, Jaimanti and Naresh¹⁵ in a 10 year follow up of patients suffering from carcinoma larynx, found the incidence of supraglottic carcinoma was 55.94% of all laryngeal cancers followed by glottis (17.3%), transglottic (13.04%) and subglottis (3.62%). Ahsan et al.⁵ showed among 36 supraglottis cases, 26 (72.2%) cases showed metastasis. Out of 13 glottis cases, metastasis was found in 4 (30.8%) cases. In Kaur et al.¹⁶ study, transglottic malignancies constituted 66% (33 cases) of the total 50 cases, while supraglottic malignancies constituted 24% (12 cases) and glottis malignancies constituted 10% (5 cases). Anicin and Zargi¹⁷ study the most common localisation of the primary tumours was glottic (48%), followed by supraglottic, transglottic and subglottic tumours in 41%, 8% and 3%, respectively.

In this study observed that more than three fourth (78.0%) patients had difficulty in swallowing followed by 17(34.0%) had hoarseness of voice, 12(24.0%) had discomfort in throat, 10(20.0%) had earache, 6(12.0%) had hemoptysis, 4(8.0%) had cough and 03(06.0%) had stridor. It was compared in Kaur et al.¹⁶ which revealed that hoarseness of voice was the most common symptom (100%) in both glottis and transglottic malignancies whereas difficulty in swallowing was the most common symptom (66.7%) in the case of supraglottic malignancies. 48.5% (16 cases) cases of transglottic malignancy presented with a mass in the neck as compared to 41.7% (5 cases) cases of supraglottic malignancies. Thus the overall incidence of nodal metastases in our series was 42% (21 cases).

It is well known that supraglottis is the commonest site of laryngeal carcinoma in subcontinent.⁶ 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.^{18,19} In Ahsan et al.⁵ 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 Kirchner²⁰ where 65% supraglottic tumour had cervical metastases and 25% glottic tumour and none of the subglottic tumour had cervical metastases.

In present study showed that out of 35 supraglottic common primary tumor was T3 14(40%), T2 was 13(37.14%), T1 was 05(14.29%). Out of 13 Glottic, among them majority was found T3 which was 05(38.46%), T2 was found 04(30.77%), T1 was 03(23.08%) and T4 was 1(7.69%). Two patients was found subglottic, among 01(50%) was T2 and 01(50%) was T3. Koirala and Sharma¹³ found their study out of total 31 patients of T3 stage, 28 had supraglottic malignancy. Albeit, neck node metastasis is mainly a 'supraglottic issue'. In fact, because of the profuse lymphatic network of the supraglottic larynx, carcinomas of this area metastasize frequently to the cervical lymph nodes, and failure of treatment is usually a result of metastasis rather than local disease.^{21,22} The incidence of patients with clinically positive lymph nodes at the time of diagnosis is 23-50% for all supraglottic sites and stages combined.^{23,24} A substantial number of those patients with clinically negative necks are found to have histologic disease, as demonstrated when neck dissection is performed, or, if left untreated, they convert

to clinically positive necks.²⁵ In supra-glottic cancers, the probability of cervical metastasis and the probability of delayed contralateral metastasis increase in direct proportion to the size of the primary lesion (i.e., the T stage).^{15,26} Lindberg²¹ reported impressive overall metastatic rates with various supraglottic carcinomas: 63% of T1, 70% of T2, 79% of T3, and 73% of T4 cases metastasized.

In this series it was observed that majority 35 patients had supraglottic carcinoma among them 15 (42.86%) had N1. Thirteen patients had glottic carcinoma among them 11(84.62%) had N₀. Two patients had subglottic carcinoma among them 1(50.0%) had N0 and 1(50.0%) had N1. In study of Ahsan et al.⁵ showed N₀ was found 20(40.0%) cases followed by N1 and N2 which were 15(30.0%) cases and 13(26.0%) cases respectively. Kaur et al.¹⁶ study 58% (29 cases) were found to be N₀ stage – constituted by 58.3% of the supraglottic lesions, 100% of the glottis lesions and 51.5% of the transglottic lesions. On the other hand, 42% (21 cases) were found to have a clinically positive neck at the time of presentation - 47.6% being in N 2 stage, 38.1% in N~ stage and only 14.3% being in N 3 stage. Anicin and Zargi¹⁷ study the regional in-field recurrence rate after selective neck dissections in postoperatively irradiated N2b and N1 cases was 12.5% and 8.3%, respectively.

The highest incidence of malignant cervical lymph node is associated with supraglottic tumour compared to glottic and subglottic carcinoma of larynx.³ The frequency distribution of supraglottic and glottic carcinoma has got wide geographical variation.²⁷ In Indian²⁸ subcontinent, supraglottic area is the commonest site of origin which is about 57% and in UK²⁷ it is about 40%. On the other hand Glottis is the

commonest site in North America (60%) and France (61%).⁴ Subglottic carcinoma is rare and least frequent type all over the world with a 5% or less in different series.⁴ Like Indian subcontinent, supraglottic carcinoma is the top among the laryngeal carcinomas in Bangladesh.⁶ In two different previous studies in Bangladesh, supraglottic cancer was found in 67%⁶, and 70% 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.

In our study it was observed that out of 35 supraglottic, among them majority (35.14%) patients was found in level II of neck nodes in right side and 23.08% was found left side, 13.51% level III of neck node was found in right side and 30.77% was found in left side. Five (13.51%) level IV of neck node was found in right side and 15.38% in left side. Out of 13 glottis, among them 05(13.51%) level III neck node was found in right side and 02(15.38%) was found in left side. Two patients had found subglottic level IV and level VI both are right side. In study of Ahsan et al.⁵ showed most frequently involved levels of the neck were level II (56.7%) and level III (33.3%). 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.⁴ Ahsan et al.⁵ reported 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 Luca et al.¹⁹ 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. In study of Kaur et al.¹⁶ showed out of the 21 cases with cervical nodal metastases at the time of presentation, levels II and III were found to be involved in 85.7% (18 cases) whereas multiple levels were involved in 71.4% (15 cases).

In our present study it was observed that majority (42.0%) patients was found in stage III followed by 18(36.0%) in stage II, 7(14.0%) in stage I and 4(8.0%) in stage IV. Koirala and Sharma¹³ study showed majority of the patients were of T3 stage 31/46 (67.4%) followed by T2 (7), T1 (6) and T4 (2) respectively. Pinilla et al.²⁹ carried out a retrospective study on 430 patients of carcinoma larynx from 1983 to 1993 in Spain. In their study, 58% of patients were of glottic origin while 42% were of supraglottic origin. T3 stage was the most common category (36%) followed by T4 (35%), T2 (23%) and T1 (6%). There was a direct correlation of tumor size with presence of histological neck node involvement. However Akmansu et al.¹⁴ and Suo et al.³⁰ reported no significant correlation to exist between T and N stages in laryngeal cancers. Ahsan et al.⁵ study observed in stage T1, the involvement of neck nodes was 14.3% cases. However stage T2, stage T3 and stage T4 were 41.2%, 81.8% and 100.0% respectively. TNM staging was done in all patients. Out of 50 patients, 7(14.0%) patients presented with T1 stage, 17(34.0%) patients in T2 stage, 22(44.0%) patients in T3 and only 4(8.0%) patients in T4 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.³¹, where 6.0% patients presented as T1, 31.0% as T2, 38.0% as T3 and 25.0% as T4. 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 T1 was 14.3%, at T2 it was 41.2%, at T3 81.8% and at T4 it was 100.0%.

Conclusion

Laryngeal carcinoma is a common clinical entity in otolaryngology practice. Male were more predominant and the highest age group was 51-60 years. In our study most common Laryngeal carcinoma was supraglottic in nature. T3 was the commonest stage of involvement. Common clinical presentation was difficulty in swallowing and hoarseness of voice. N₀ and N1 was the most common pattern of neck node metastasis. In our series majority of them were in level II.

Early detection and management yield better prognosis. Special emphasis on neck node metastasis in carcinoma larynx is an important determining factor in treatment modality as well as meaningful outcomes after definitive treatment.

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