



PATTERN OF NECK LYMPH NODE METASTASIS AND FACTORS AFFECTING THE LYMPH NODE METASTASIS IN SQUAMOUS CELL CARCINOMAS OF HEAD AND NECK

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ABSTRACT

Background: Head and neck cancer exhibits metastases to cervical lymph nodes through certain lymphatic drainage routes. The 5-year survival rate for patients with neck metastases reduces depending on the number and level of nodes involved. **Objective:** To assess the patterns of lymph node metastasis for squamous cell carcinoma of head and neck and analyse the prognostic factors of cervical node status and highlight their effect on treatment and prognosis. **Method:** The study entailed a cross sectional analysis of 66 patients with squamous cell carcinoma of head and neck radiologically or pathologically proven. Data collected and was analysed by a chi square test using SPSS (version 20). **Results:** Of the 66 clinically node-positive patients, 18 had bilateral lymph node metastasis and 48 had ipsilateral LNM. In all primary sites pattern of lymph drainage was followed except for in 1 case of carcinoma larynx where metastasis was to level II and IV without involvement of level III. **Conclusion:** We concluded majority of the HNSCC cases followed normal pattern of drainage and in individuals with oral cavity and oropharynx SCC, the incidence of bilateral neck LNMs are high particularly to level II of contralateral side. With higher stage of the disease and long duration of symptoms chances of lymph node metastasis is high thus worsening the prognosis. Bilateral neck dissection is recommended for primary surgical treatment, with the exception of early stages, when ipsilateral neck dissection may be performed.

KEYWORDS

Lymph node metastasis, Head and neck squamous cell carcinoma, Prognostic factors.

INTRODUCTION

Head and neck cancer exhibits metastases to cervical lymph nodes through certain lymphatic drainage routes. Each major site of the upper aerodigestive tract is represented by a particular sentinel lymph node where metastasis occurs. The only physical barrier that may temporarily stop the spread of metastatic disease to an area that can be treated surgically or with radiation therapy is these sentinel lymph nodes¹. The presence of cervical lymph node metastases is the most significant prognostic factor for individuals with upper aerodigestive tract squamous cell carcinoma. The 5-year survival rate for patients with neck metastases reduces depending on the number and level of nodes involved as well as whether a capsular rupture is present². The indication of neck dissection in head and neck cancer is a challenge of weighing the risks and benefits of neck metastasis, neck dissection problems, and potential prognostic effects of delayed identification of metastasis during follow-up³. Only when the lymphatic distribution pattern is known and the type of neck dissection is chosen appropriately can an oncologically sound surgical treatment be performed with minimal morbidity⁴. In this study, we aim at assessing the patterns of lymph node metastasis for squamous cell carcinoma of different primary tumour locations in head and neck cancer and also analyse the prognostic factors of cervical node status and highlight their effect on treatment and prognosis.

MATERIALS AND METHOD

A descriptive cross-sectional study was done after taking institutional ethical committee clearance. A total of 66 patients meeting inclusion and exclusion criteria visiting ENT OPD of KVG medical college were included in the study. The study was carried out for the period of 18 months.

Inclusion Criteria

1. Patients of all ages and both sex.
2. Newly diagnosed radiologically and/or pathologically confirmed cases squamous cell carcinoma of head and neck.
3. Squamous cell carcinoma of Head and neck with concurrent benign and premalignant lesion in head and neck region
4. Patient who are willing to give informed consent.

Exclusion Criteria

1. Patients having only benign masses or lesion in head and neck region.
2. Recurrent cases of head and neck malignancy
3. Patients on treatment for head and neck malignancy.
4. Cytological proven secondaries from primary elsewhere.
5. Cases of carcinoma of unknown primary with secondaries to neck.

This was followed by investigations like USG neck, FNAC of lymph node, wedge biopsy, renal function test, CT scan plain with or without

contrast, MRI plain with or without contrast wherever it is needed. The lymph nodes were considered metastatic if their maximum diameter was more than 10 mm, and/ or if central necrosis, heterogeneous contrasting, irregular contours or peripheral soft tissue invasion were present.

Clinical tumour-node staging was performed according to the American Joint Committee on Cancer staging system 8th edition. Clinical staging of the primary tumour involved both physical examination and imaging study findings.

Statistical Analysis

All statistical analyses were performed using Microsoft Office Excel 2007 and IBM SPSS version 20. A probability value of p-value (<0.05) was considered statistically significant.

The pattern of neck lymph node metastasis on clinical palpation for each malignancy was assessed. All parameters likely to influence lymph node metastasis, including sex, age, smoking, alcohol and tobacco use, tumour location, histological differentiation, primary subsite, T stage, comorbidity, duration of symptoms and ipsilateral metastasis (IM), were analysed by using univariate analysis.

RESULTS

Patient Characteristics

A total of 66 patients were included in the study out of which 20 were females and 46 were males aged between 31 – 78 years (mean age of 59.3 years) shown in below (table 1).

Table no 1 : Distribution of population studied based on gender.

Gender	Number of patients	Percentage (%)
Females	20	30.3%
Males	46	69.6%
Total	66	100%

Table no 2: Distribution of lymph node metastasis side according to primary site

PRIMARY SITE	U/L LNM	B/L LNM	TOTAL
Ca Oral cavity	29	9	38
Ca Oropharynx	3	4	7
Ca Larynx	12	1	13
Ca Hypopharynx	4	2	6
Ca Maxillary sinus	0	2	2

A total of 48 (72.7%) patients had ipsilateral neck lymph node metastasis and 18 (27.2%) had contralateral neck nodes also involved as shown in (table 2) according to their primary site distribution.

Distribution of LNM According to Different Clinical LN Status

Pattern of metastasis according to the primary subsites is depicted in the following flow charts from fig I-V.

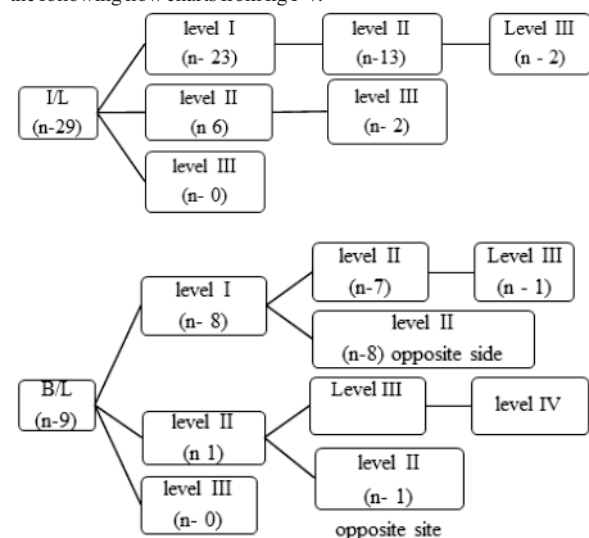


Fig : I Shows pattern of metastasis in carcinoma oral cavity where in both ipsilateral and bilateral neck metastasis cases followed normal pathway.

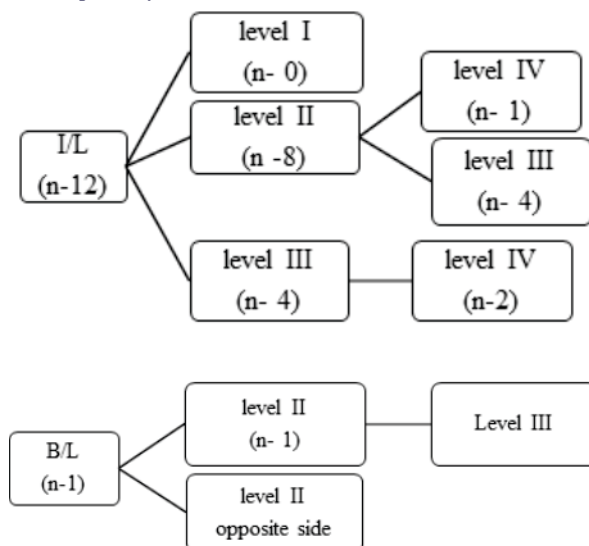


Fig: II Shows pattern of metastasis in carcinoma larynx where in bilateral neck metastasis cases followed normal pathway and in ipsilateral metastasis 1 patient had skip metastasis to level IV from level II

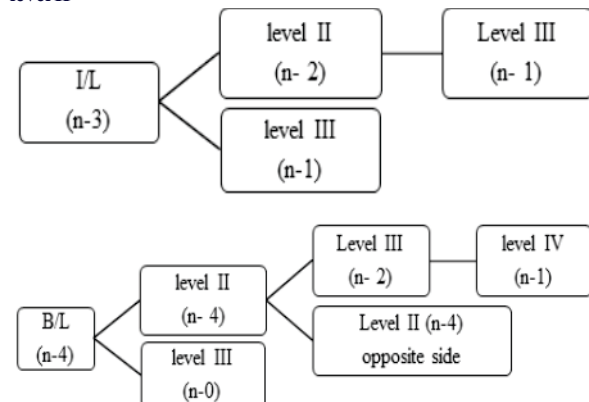


Fig: III Shows pattern of metastasis in carcinoma oropharynx where in both ipsilateral and bilateral neck metastasis cases followed normal pathway.

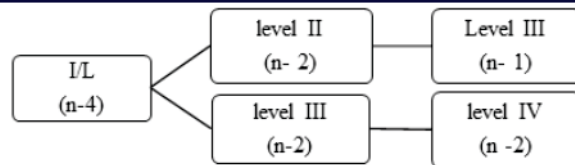


Fig: IV Shows pattern of metastasis in carcinoma hypopharynx where in both ipsilateral and bilateral neck metastasis cases followed normal pathway.

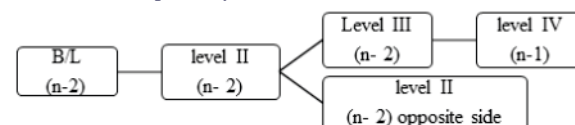


Fig: V Shows pattern of metastasis in carcinoma maxillary sinus where in both bilateral neck metastasis cases followed normal pathway.

Table no 3: Association between various factors affecting ipsilateral and bilateral lymph node metastasis

	Variable	LN B/L	%	LN U/L	%	Total	P value
Clinical stage	Stage I,II,III	0	0%	20	100%	20	0.001
	Stage IV	18	39.1%	28	60.8%	46	
HPE	EISCC	0	0.0%	1	100.0%	1	0.524
	ISCC	0	0.0%	3	100.0%	3	
	MDSCC	6	40.0%	9	60.0%	15	
	PDSCC	1	16.7%	5	83.4%	6	
Co morbidity	WDSCC	9	25.0%	27	75.0%	36	0.845
	Absent	15	27.7%	39	72.25	54	
Duration of symptoms	Present	3	25%	9	75%	12	0.002
	<6months	4	11.4%	31	88.5%	35	
Addiction	>6months	14	45.1%	17	54.8%	31	0.906
	Smoking	12	30.0%	28	70.0%	40	
	Alcohol	8	34.8%	15	65.2%	23	
	Tobacco	8	29.6%	19	70.3%	27	

In (table 3) shows various contributing factors considered for affecting ipsilateral and bilateral lymph node metastasis. Here clinically significant association is seen between clinical stage of disease and duration of symptoms with lymph node metastasis ($p < 0.05$).

DISCUSSION

HNSCC is an epithelial cancer that develops in the upper aerodigestive tract mucosa. Males in India are more likely to have HNCs than females⁵. Findings from our study are similar, with the majority of cases involving men. In our study oral cavity has been reported to have the most HNSCC cases, followed by larynx, the incidence of oropharyngeal and hypopharyngeal cancers was nearly similar, with carcinoma of the maxillary sinus having the lowest incidence. The pattern of lymph node metastasis in 38 cases of carcinoma oral cavity shows majority with ipsilateral lymph node metastasis i.e 29 cases. In accordance with the usual pattern, level I and II was followed by level III rather than separately. In 20.6% it skipped level I and directly went to level II. Lymphatic drainage pattern in oral carcinoma is most frequently to metastasis at levels I–III, and occult metastasis is also most commonly seen in levels I–III^{6,7}. In 9 cases of bilateral nodes involvement level II was affected in all in opposite side along with ipsilateral nodes.

The lymphatic drainage of the oropharyngeal area primarily affects the retropharyngeal lymph nodes and lymph nodes at levels II and III. Malignancies of the posterior and the lateral walls exhibit a predisposition for metastases to level II and retropharyngeal lymph nodes⁹. In our study, carcinoma oropharynx 3 cases had ipsilateral metastasis and 4 cases had bilateral metastasis, in ipsilateral

metastasis it followed the pattern i.e level II and III, but in all cases of contralateral metastasis level II was involved with I/L level II and III and IV. We reported more incidence of bilateral nodes involvement in carcinoma oropharynx, this can be due to the lesions like in base of tongue mainly being in the midline and also patient reporting late.

In our study, cases with carcinoma larynx metastasis to level II and III is common followed by to level II only. In 1 case metastasis was to level II and IV without involvement of level III. This shows skip metastasis. Rest all followed the pattern. Only 1 case of carcinoma larynx – ca glottis had contralateral lymph node involvement of level II along with level II and III in I/L side, patient had multiple comorbidities in 7th decade of life. Supraglottic cancer tends to have a higher rate of contralateral metastasis than glottic and subglottic cancer⁸.

Hypopharynx mainly drains to level II and III and more rarely to level IV. The posterior wall of hypopharynx drains usually first to retropharyngeal lymph nodes⁹. Lymph node metastasis from hypopharynx tumours occurs 65–80% of the time, whereas occult metastasis occurs 30–40% of the time¹⁰. In our study out of 6 cases of carcinoma hypopharynx 4 were having only ipsilateral metastasis. Cases with ipsilateral metastasis followed the normal drainage pathway i.e level II, III, IV. In both the cases of bilateral metastasis level II was involved in contralateral side with ipsilateral nodes also.

Both the cases of carcinoma maxillary sinus included in this study had bilateral neck lymph node metastasis with ipsilateral neck nodes also present. Both the cases followed the normal pattern on ipsilateral side with level II involvement on contralateral side, it can be due to both cases reported in later stages and were in 6th and 7th decade of life.

Here clinically significant association is seen between clinical stage of disease and duration of symptoms with bilateral lymph node metastasis ($p < 0.05$) which concludes that with higher stage of the disease chances of lymph node metastasis is high, sometimes it may be clinically not palpable but micrometastasis can be there also chances for bilateral metastasis become higher with later stages of the disease. Same scenario can be seen with patients with long duration of history of disease, they can present with bilateral metastasis thus worsening the prognosis.

CONCLUSION

This study contributes to our understanding of the lymphatic dissemination of HNSCC. Regional Lymph node metastasis usually follows a regular pattern, and lymph node skipping was rare. At every stage of the disease, HNSCC has a pronounced tendency to spread to regional lymph nodes in the neck. We concluded that in individuals with oral cavity and oropharynx SCC, the incidence of bilateral neck LNMs are high particularly to level II of contralateral side with lesions that are typically midline and extensive lesions also with higher stage of the disease and long duration of symptoms chances of lymph node metastasis is high thus worsening the prognosis. However in this study we were not able to detect micrometastasis as we limited us investigation upto preoperative period only thus excluding histopathological findings of specimens. Bilateral neck dissection is therefore recommended for initial surgical treatment, with the exception of early-stage, clearly lateralized cancers staged, where ipsilateral neck dissection may be an option.

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