A Prospective Study of Level IIB Nodal Metastasis (Supraretrospinal) in Clinically N0 Oral Squamous Cell Carcinoma in Indian Population.

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Abstract Oral cavity carcinoma is the most common cancer in Indian population. Metastatic nodal disease is the most important prognostic factor for oral cancers. In head and neck cancers with clinically N0 neck, standard selective neck dissection is performed by protecting the spinal accessory nerve to remove level IIA & IIB lymph nodes. The purpose of this study was to analyze the significance of level IIB dissection in patients of oral cavity cancer who underwent primary surgery with functional neck dissection. Two hundred ten patients with clinically N0 neck underwent neck dissection, where level IIB lymph nodes were dissected, labelled and processed separately. Among 210 patients of clinically N0 neck, 168 patients were pathologically N0 (80 %). Out of remaining 42 (20 %), 36 (17.14 %) were pN1 and 6 (2.86 %) were pN2. Among those with pN1 (36), level IB was involved in 24 patients (66.67 %) and level IIA was involved in 12 patients (33.33 %). Only 2 patients had involvement of level IIB lymph nodes. Among 6 patients of pN2 disease, 4 patients had simultaneous involvement of level IB and level IIA lymph nodes. Remaining 2 patients had isolated involvement of level III lymph nodes. Thus only 2 patients (< 1 %) out of 210 clinically N0 oral squamous cell carcinoma showed level IIB lymph node involvement. Thus we conclude that a frozen section of level 2a is advisable to decide the need for level 2b node dissection in clinically N0 neck as the sensitivity of clinical evaluation is extremely low.

Keywords Oral squamous cell carcinoma · Clinically N0 · Level IIB lymph nodes

Oral cavity carcinoma is the most common cancer in Indian population which is probably attributable to the usage of tobacco in its various forms. The pattern that emerges from the data of hospital based registries over the last 15 years is of a rising trend in the incidence [1,2]. Metastatic nodal disease is the most important prognostic factor for oral cancers [3,4]. In head and neck cancers with clinically N0 neck, standard selective neck dissection is performed by protecting the spinal accessory nerve to remove level IIA & IIB lymph nodes [5,6].

The area among the spinal accessory nerve, digastric muscle, and sternocleidomastoid muscle at the posterior is called level IIB (supraretrospinal recess), and other parts of level II bordered by the spinal accessory nerve at the superior is known as level IIA.

Close relationship to important structures like the spinal accessory nerve, internal jugular vein, internal carotid artery and occipital artery makes dissection of level IIB technically difficult. The spinal accessory nerve injury occurs most commonly due to nerve traction during the operation, resulting in shoulder pain and functional impairment post-operatively. Level IIB rarely shows metastatic changes in patients with an N0 neck [7,8].

The purpose of this study was to analyze the significance of dissection of the level IIB in patients with oral cavity squamous cell carcinoma (SCC) who underwent primary surgery with functional neck dissection.

Materials and Methods

Patients with SCC of the oral cavity and clinically N0 neck, were confirmed radiologically by ultrasound of the neck.

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Table 1 Site of primary lesion

Site	Number of patients	%
Tongue	150	71.43
Buccal mucosa	30	14.28
Lower alveolus	26	12.38
Retromolar trigone	4	1.90
Total	210	

These patients who underwent surgical treatment for the primary lesion and therapeutic neck dissection from January 2010 to May 2012 were included prospectively. Patients who received neoadjuvant chemotherapy were excluded. Based on these criteria, 210 patients were identified. The American Joint Committee on Cancer Tumour-Node-Metastasis (TNM) Classification System was used to classify primary tumour of the neck, and the Memorial Sloan-Kettering Cancer Centre classification was used to classify the cervical lymphatic chain.

The following data were obtained from patient charts: sex, primary lesion site, TNM status, operative procedure (especially type of neck dissection), number and level of cervical lymph node metastases.

After extirpation, the neck dissection specimens were stored separately according to the neck level (level IIA & IIB separately) and then sent for histological examination. Histological examination included the number and location of the nodes containing metastatic disease in levels I, IIA and IIB, III, IV and V. The pathological T and N stage according to the UICC were determined by evaluation of the pathological reports, while the M stage was classified from radiological findings.

The numbers of lymph nodes and the frequency of the metastases at level IIB were determined and categorized into subgroups based on the location of the primary tumour of the oral cavity. All specimens were categorized into the lymph node levels perioperatively by the surgeon according to the original anatomic position. The size of each node was recorded. Lymph nodes larger than 5 mm were taken out for sending cross-sectional histological examination.

Table 2 Clinicopathological stage of primary lesion

Clinical	Number	%
cT1	76	36.19
cT2	118	56.19
cT3	12	5.71
cT4	4	1.9
Pathological		
pT1	96	45.71
pT2	84	40
pT3	18	8.57
pT4	8	3.8

Table 3 Correlation of type of neck dissection and pathological node status

Type of neck dissection	Pathological node status
Modified neck dissection (120)	38
Extended SOHND (40)	2
SOHND (50)	2

Results

Two hundred ten patients of oral SCC with clinically N0 nodal status were included the study. One hundred fifty six patients were male (74.28 %) and 54 were female (25.71 %) (Table 1).

Most common site of origin of primary with clinically N0 nodal status is oral tongue (71.43 %).

Out of 210 patients 120 (57.14 %) underwent modified neck dissection. Forty (19.05 %) patients underwent extended supra omohyoid neck dissection (SOHND). Remaining 50 (23.81 %) underwent SOHND.

In total, 4330 lymph nodes were dissected from level I to V. Average nodes per lymph node dissection was 20.62. 1164 of them were in level IIB with an average yield of 5.5.

Most of the patients in the study belonged to cT2 stage (56.19 %) (Table 2).

Most of the patients in the study belonged to pT1 stage (45.71 %) (Table 2).

The correlation of pathological node status and type of neck dissection (Table 3).

The pathological nodal status of clinically N0 disease is as follows (Table 4).

Table 4 Disease stage and lymph node status

	pN0	pN1	pN2
pT1	90 (42.86 %)	12 (5.7 %)	0
pT2	64 (30.48 %)	16 (7.6 %)	2 (0.95 %)
pT3	10 (4.76 %)	4 (1.9 %)	2 (0.95 %)
pT4	4 (1.9 %)	4 (1.9 %)	2 (0.95 %)
Total	168 (80 %)	36 (17.14 %)	6 (2.86 %)

Table 5 Level of lymph node involvement in Pn+

LEVEL	PN1	PN2	PN+
IA	24	4	28
IIA	12	4	16
IIB	2	0	2
III	0	2	2
IV	0	0	0
V	0	0	0

Eighty percent of patients with clinically N0 ipsilateral nodal status irrespective of the primary site of origin have pathologically N0 disease. Approx. 17.5 % of clinically N0 show pathological N1 and 2.5 % show pathological N2 disease.

Among 36 patients of pN1, only two patients of Ca tongue (cT2, pT2) showed evidence of level IIB lymph node involvement (1 out of 4 nodes positive). These patients also had level IIA lymph node involvement (2 out of 4 nodes positive) (Table 5).

Among 6 patients with pN2 disease, level IB and IIA nodes were involved in 4 patients (66.67 %) and two patients showed isolated skip metastasis to level III nodes.

Only two patients from 210 showed evidence of level IIB lymph node involvement (0.95 %). The involvement of level IIB lymph node in this patient was associated with simultaneous level IIA nodal involvement. There was no evidence of isolated level IIB lymph node involvement in clinically N0 disease.

Discussion

Oral cavity SCC readily metastasizes to adjacent cervical lymph nodes. Level IIB drains the skin of the head and neck, the nasal cavity, and nasopharynx, these lymph nodes drain into the jugular and spinal accessory nodes. Level IIB does not drain the oral cavity, oropharynx, larynx, or hypopharynx [9,10]. In head and neck cancers, a lower incidence of metastasis in the posterior cervical area has been determined, but few publications mention the frequency of metastasis at level IIB [11].

Removal of level IIB lymph nodes bears the risk of injuring the accessory nerve by traction, which is sometimes inevitable, or by interruption of its vascular supply leading to shoulder dysfunction [5,6]. Because of the high risks associated with the dissection of level IIB, the question arises as to in which cases a dissection of these regions is justified and in which cases it can be omitted without impairing the oncological clearance.

To date, only few studies on oral cavity cancers investigate the metastasis to level IIB. It is believed that the metastasis seen at level IIB are formed by way of retrograde lymph node flow, which forms as a result of the obstruction by the metastasis on the other lymphatic chains and the failure of the valves of the lymph vessels.

In our study, only 2 metastasis at level IIB was seen in patients of carcinoma tongue cT2N0. Even in late-stage oral cancers, metastases at level IIB are rare.

Kraus et al., analyzed level IIB node metastasis in a selected group of patients who underwent supraomohyoid neck dissections, and the frequency of the metastasis at level IIB was 2.1 % [12]. Villaret et al., recognized the frequency of the

metastasis as 6.5 % in a group of 51 patients with all types of head and neck cancers, and Silverman et al. also recognized the frequency as 4.4 % in a similar group [13–15]. Koybasioglu et al. found no level IIB metastases in 74 neck dissections performed on 49 patients with laryngeal cancer [16].

In our series which included 210 patients of oral cancers, 50 SOHND, 40 extended SOHND and 120 MND were done. Only 2 patients showed evidence of metastasis at level IIB among 210 neck dissections (<1 %). This was associated with simultaneous involvement of level IIA. There was no evidence of isolated level IIB lymph node involvement in clinically N0 disease. Of 210 cases of cN0 neck, 80 % were pN0. Out of remaining 20 % pN+, 66 % showed evidence of level IB nodal involvement.

Therefore, the recommendation given by numerous authors to preserve level IIB in patients with oral carcinomas and clinical N0 neck is supported by the present data.

Conclusion

The incidence of level 2b lymph node involvement in clinically No neck is rare. Thus we conclude that a frozen section of level 2a is advisable to decide the need for level 2b node dissection in clinically N0 neck as the sensitivity of clinical evaluation is extremely low.

References

1. Parkin DM, Pisani P, Ferlay J (1999) Global cancer statistics. *CA Cancer J Clin* 49:33–64
2. Sankaranarayanan R (1998) Head and neck cancer: a global prospective on epidemiology and prognosis. *Anticancer Res* 18:4779–4786
3. Johnson JT (1995) Cervical LN metastases. *Arch Otolaryngol* 111: 534–537
4. Moore S, Jhonson A, Pierce A (2006) The epidemiology of mouth cancer. *Oral Dis* 6:65–74
5. Cheng PT, Hao SP, Lin YH, Yeh AR (2000) Objective comparison of shoulder dysfunction after three neck dissection techniques. *Ann Otol Rhinol Laryngol* 109(8):761–766
6. Pieter UD, Paul CV (2001) Incidence of shoulder pain after neck dissection: a clinical explorative study for risk factors. *Head Neck* 23(11):947–953
7. Sefik Hosal A, Ricardo LC (2000) Selective neck dissection in the management of clinically N0 neck. *Laryngoscope* 110(12):2037–2040
8. John WW, Diana HE (2003) Elective management of the clinically negative neck in patients with oral tongue cancer. *Arch Otolaryngol Head Neck Surg* 129(1):83–88
9. Pitman KT, Johnson JT, Myers EN (1997) Effectiveness of selective neck dissection for management of the clinically negative neck. *Arch Otolaryngol Head Neck Surg* 123:917–922
10. Ambrosch P, Kron M, Pradier O, Steiner W (2001) Efficacy of selective neck dissection: a review of 503 cases of elective and

- therapeutic treatment of the neck in squamous cell carcinoma of the upper aerodigestive tract. *Otolaryngol Head Neck Surg* 124:180–187
11. Davidson BJ, Culkarny V, Delacure MD, Shah JP (1993) Posterior triangle metastases of squamous cell carcinoma of the upper aerodigestive tract. *Am J Surg* 166:395–398
 12. Dennis HK, Rosenberg D, Davidson B, Saha A (1996) Suprascapular accessory lymph node metastasis in supra omohyoid neck dissection. *Am J Surg* 172(6):646–649
 13. Villaret AB, Piazza C, Peretti G et al (2007) Multicentric prospective study on prevalence of sublevel IIB metastasis in head and neck cancer. *Archives of Otolaryngology-Head and Neck Surgery*: 133 (9)
 14. Roberto S, Alessandro Frachi O, Giulia B et al (2008) Nodal metastasis at level IIB during neck dissection for head and neck cancer: clinical and pathological evaluation. *Head Neck J Sci Specialities Head Neck* 30(11):1483–1487
 15. Silverman DA, EL-Hajj M et al (2003) Prevalence of nodal metastasis in submuscular recess(level IIB) during selective neck dissection. *Archives of Otolaryngology-Head & Neck Surgery* 29 (7)
 16. Koybasioglu A et al (2012) The necessity of dissection of level IIB in laryngeal squamous cell carcinoma a clinical study. *Otolaryngol Head Neck Surg* 146(3):390–394