ORIGINAL RESEARCH PAPER

Surgery

ASSESSING THE NEED FOR DOING A LEVEL V CERVICAL LYMPH NODE DISSECTION FOR ALL CLINICALLY POSITIVE CERVICAL LYMPH NODES IN SQUAMOUS CELL CANCERS OF THE ORAL CAVITY AND PREDICTING FACTORS INDICATING METASTATIC INVOLVEMENT OF LEVEL V LYMPH NODES

KEY WORDS:

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ABSTRACT

Posterior triangle lymph node dissection(Level V lymph node dissection) of neck is a part & parcel of Modified Radical neck dissection(MRND) and carries with it the risk of shoulder dysfunction due to spinal accessory nerve traction or iatrogenic injury during dissection. The aim of our study was to determine the role of dissection of Level V lymph nodes in patients suffering from Oral squamous cell cancers & to determine the factors that predicted level V lymph node metastasis .We had studied 108 patients with Oral SCC on whom we had performed a MRND and had dissected and separately labelled Level V lymph node and sent them separately for histopathological examination to detect their involvement . Amongst 108 patients , 33 were clinically N0 (cN0). And none had Level V lymph node metastasis.Of the 75 patients with positive neck nodes, 30 patients were clinically N1and of these 21 patients had only Level 1B & the rest 9 had level 2/3 lymph node involvement.None of these patients had Level V lymph nodal involvement . Out of the 75 clinically node positive patients , 45 patients were clinically N2 (cN2). Only 6 patients among these 45 patients; who were both clinically and pathologically N2, had Level V lymph nodal metastasis. Overall Level V lymph node involvement was only in 5.5 %(6 patients) according to our study. Of this tongue cancers(4 patients) were the most common cancers to have Level V lymph nodal metastasis.All patients who had Level V lymph nodal metastasis also had Extracapsular spread(100%).Due to the very low incidence of level v lymph nodal metastasis that we found in our study we concluded that one could safely undergo selective neck dissection (SND)in cN0 patients & cN1 patients with only Level 1 B involvement selectively . Potential risk factors for Level V lymph nodal metastasis were clinically evident ECS, and large fixed multiple cervical lymph nodal involvement

INTRODUCTION

Potential metastasis from squamous cell cancers of the oral cavity to the cervical lymph nodes remains a matter of concern in their management and future prognosis . The risk of metastasis to neck nodes varies according to the site and extent of the primary tumour. The possibility of occult cervical lymph nodal metastasis is also a problem.

Initial scepticism amongst surgeons about Selective neck dissection(SND) (who some thought as a staging procedure only) has given way to the concept that SND actually offers a survival benefit for patients having occult nodal disease.[1]

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Metastasis to the regional lymph node is the single most important prognostic factor in predicting local and distant failure as well as survival.[1]The nodal metastasis reduces the survival by 50%. Level V lymph node dissection has been significantly associated with postoperative shoulder dysfunction due to spinal accessory nerve dysfunction.

The aim of our study was to determine the need for level V lymph node dissection in oral cavity cancers and make at attempt to determine what are the factors that can predict Level V Lymph nodal metastasis, which therefore mandates a more comprehensive neck dissection.

Head and neck cancer accounts for 10% of all malignancies worldwide and upto 40% cancer burden in India.[2] Amongst head and neck cancers oral cavity cancer is the most common and account for 30% of all cases. Squamous cell carcinoma is the most common histological type (90%) of all oral cavity cancer. Oral cavity cancer is the most common in Indian male with 35% of total cases and 3rd most common in Indian female with 18% of total cases.[3]The high incidence of cancer is attributable largely to the habit of chewing betel nuts, tobacco and pan (mixture of tobacco, lime and other substances wrapped in a vegetable leaf). In a developing country like India only 10 to 15% of cases present in localised stages.[3]

There were certain observations which brought the concept of Selective Neck Dissection in the management of neck. **First,** regional lymph node involvement in oral cavity squamous cell carcinoma occurs in a predictable and sequentially progressive manner. Level V lymph node involvement in oral cavity SCC is a rare finding. **Second,** despite advances in surgical and adjuvant chemoradiation therapy, the diagnosis of oral cavity cancer continues to portend a poor prognosis. This is evidenced by the fact that over all 5 year survival has essentially remained unchanged over the past 30 years.[4] **Third** and most important, level V LN dissection has been significantly associated with post operative shoulder dysfunction as a sequel of spinal accessory dysfunction in some patients even when the nerve remains intact and this injury probably occurs secondary to traction or with ischemic injury to the nerve[5,6]These facts lead to the shift in paradigm of neck management from Radical Neck Dissection (RND) to Modified Radical Neck Dissection (MRND) and subsequently to Selective Neck Dissection(SND). Role of SND in the

management of clinically node negative (cN0) oral cavity cancer is undebatable. [7,8]

MATERIALS AND METHODS

We had conducted a prospective case study series from January 2014 to December 2017 ; a period of almost 4 years in two premier Medical College Hospitals in Kolkata. During this period we have evaluated over 108 patients who had undergone surgical treatment for Oral SCC along with modified Radical neck Dissection (MRND)

The inclusion criteria in our study were primary tumours confined within the oral cavity & histopathologically proven to be Squamous cell carcinoma preoperatively & patients who had underwent the primary surgery in our institute .

The exclusion criteria of our study were primary surgery done out of our institute , patients who had taken preoperative radiotherapy/chemotherapy & patients with multiple primary tumours .

Before operating upon the patient , a thorough history taking & clinical examination was done.This included oral cavity examination, bilateral neck node examination, Indirect laryngoscopic examination & general examination of the patient which took into account especially about the nutritional status, pallor and vital status of the patient.

Computed tomography scan (C.T.Scan) was used as an investigative tool to confirm operability in selected patients especially in those patients having large lesion reaching upto Retromolar trigone,& presenting with trismus; to look for mandibular involvement.

Clinical N stage was confirmed by USG neck in all cases.
Preoperative incisional biopsy was done in all cases to confirm the lesion to be a squamous cell carcinoma.

The patients were then staged according to AJCC/TNM criteria.
Modified Radical neck dissection was done in a standard fashion (figure 1 , 2 and 3)after excision of the primary cancer and before reconstruction of the defect.

Figure 1-Standard skin incision given for MRND

Figure 2 Completed RIGHT SIDED MRND AFTER EXCISION OF SCC BUCCAL MUCOSA

Figure 3 SAN visible after completion of level V dissection.

During surgery, the Level V lymph nodes were dissected & labelled separately from the neck dissection specimen .

Analysis of the tumour was done like grades of differentiation , lymphovascular & perineural invasion(LVI/PNI), extracapsular spread (ECS), total number & level of lymph nodes involved.

Review of data was carried out to evaluate potential risk factors for level V lymph node metastasis .

Results & Analysis

In our study of 108 patients conducted over a period of almost four years , the age range of our patients were between 20-74 years with maximum number of patients in the age range of 51-60 years The Male : Female ratio in our study was 2.6:1 with 78 males and 30 females

We had a total of 108 cases of Oral Squamous cell cancers in our study with 41.6% (45 patients) having cancers of the buccal mucosa / Retromolar trigone; 27.7% (30 patients) having lip cancers , 25% (27 patients) having tongue cancers & 2.7% (6 patients) having floor of mouth cancers (Table 1).

Table 1 Types of Oral cancers in our study

No	Type of Oral SCC	No of cases	Percentage
1	Cancers of the buccal mucosa /RMT	45	41.7%
2	Lip Cancers	30	27.8%
3	Tongue cancers	27	25%
4	Floor of mouth cancers	6	5.5%

The total cervical lymph node harvest in our study were 2559 which were neck nodes dissected from Level I to Level V in each case. 22.4 lymph nodes were dissected on an average from each specimen and the total number of specimens examined were 114 (as in 6 patients Bilateral cervical neck node dissections were done) 6.29 was the average number of Level V lymph nodes dissected from each specimen .

Amongst 108 patients in our study only 30.5% of patients (33 patients) were clinically N0(i.e. having a clinically negative neck node) , 69.5% (75 patients), were cN+ (Clinically node positive),

Out of the 30.5 % of patients (33 patients) who were Clinically N0 , 36.4 % (12 patients) had occult metastasis in the final report. The rest 63.6 % (21 patients) were pathologically proven to be N0 .
Of these 33 patients who had a clinically negative neck node ,none had Level V positive lymph node metastasis .

Of the 69.5 % of patients (75 patients) who were clinically node positive;

40% (30 patients) were clinically N1(i.e. having single ipsilateral neck node < 3 cm). Amongst these 40 % patients who were clinically N1 , 70 % (21 patients) had Level I b neck nodes involved clinically & 30 %(9 patients) had Level II/III neck nodes involved clinically .None of these patients had Level V lymph nodal

metastasis in our study Of these 40 % (30 patients)with clinically N1 neck only 20 % (6 patients)were pathologically N1 , while 50 % (15 patients) were pathologically N0 & 30 % (9 patients) were pathologically N2.

Out of the 75 clinically node positive patients , 60 % (45 patients) belonged clinically to the N2 group (cN2). Of these 45 patients, 6.7 % (3 patients) had single lymph node >3 cm (cN2a) clinically ,a large majority of about 86.7 % (39 patients) had multiple ipsilateral neck nodes none <6 cm (cN2b) & again only 6.7 % (3 patients) had bilateral neck node involved clinically with none of the neck nodes > 6 cm .(cN2c)

Again out of the 45 patients having clinically N2 disease 26.7 % (12 patients) were actually pathologically N0, 6.7 % (3 patients) were pathologically N1 & 66.7 % (30 patients) were pathologically having N2 disease.(Table 2).

Table 2 Prevalence of Level V lymph node involvement in Clinically N2 patients

Pathological staging	Prevalence	Extracapsular spread	Lymphovascular invasion	Level V lymph nodal metastasis
pN0	12	0	0	0
pN1	3	O	0	0
pN2	30	27	18	6
Total	45	27	18	6

Amongst the 3 patients who were having pathological N1 disease, clinically all were having N2 disease, & amongst the 30 patients who were having pathological N2 disease, clinically 27 were N2b & 3 were N2c .

Amongst a total of 735 level V lymph nodes examined, in 108 patients , only 6 patients amongst 108 patients ,i.e only 5.5 % of cases had positive Level 5 lymph nodes according to our study(Table 3).Of these 6 cases with Level V lymph nodal metastasis ; 4 patients were having tongue cancers.The rest 2 patients had cancers of the floor of the mouth.

Table 3 Relation of Clinical stage with level V lymph nodal involvement

No	Stage	No. of Patients	No. of lymph nodes examined histopathologically	Level V lymph node positivity
1	Clinically N0	33	195	0
2	Clinically N1 with palpable Level 1 B lymph nodes	21	171	0
3	Clinically N1 with palpable Level II/III lymph nodes	9	60	0
4	Clinically N2	45	309	6

All the oral cancers which had Level V lymph nodal metastasis showed extra capsular spread (ECS).

Finally another important finding in our study was the fact that in the 6 cases where Level V lymph nodes were involved , the size of the largest clinically positive lymph node was more than 3 cm .

In all other cases the size of the largest clinically positive neck node was <3 cm .

Discussion

It was Crile who advocated Radical Neck Dissection (RND) as an essential component in the management of Head and Neck cancerS in 1906, which became the standard of treatment for oral cancers at his time.

Over the years, radicalism of RND has given way to Modified Radical Neck Dissection (MRND) with the same surgical and oncological safety preserving important involved structures like spinal accessory nerve, Internal Jugular Vein and Sternocleidomastoid muscle.

Modified Radical neck dissection (MRND); itself has been challenged by Selective Neck Dissection for example Supra Omohyoid Neck Dissection(SOHND). This later became more popular with the use of Sentinel Lymph Node Biopsy (SLNB) removing nodal groups which have the highest risk for containing metastasis, according to location of primary tumour.

Andre et al. shown that SND when performed in the cN0 neck, the risk of ipsilateral nodal recurrence was 5%, with the recurrence rate climbing to 9-15% when done in a clinically node positive (cN+) neck.[9]

He further showed that the incidence of occult metastasis in clinically N0 (cN0) patients was 24%. Amongst 108 patients in our study only 30.5% of patients (33 patients) were clinically N0 (i.e. having a clinically negative neck node). Of these 30.5% patients with cN0 neck, 36.4% (12 patients) had occult metastasis in the final report.

This is comparable to other studies like those of Parekh et. al. who have shown the rate of occult metastasis to be 24% in clinically N0 neck.[19]Andre et. al also found a rate of occult metastasis to be 24%.[9]

Apart from controlling occult metastasis, Selective Neck Dissection provides valuable pathological information for staging and planning of adjuvant therapy.

The concept of Selective Neck Dissection is based on the clinical observation that SCC of upper digestive tract metastasize to cervical lymph nodes in a predictable and sequentially progressive pattern.[16]

Various studies have evaluated the efficacy of SND in the clinically node positive neck and compared it with MRND.

Ambrosch et al. had found that the local control after SND was comparable with MRND in his study on 503 patients having SCC of the upper aerodigestive tract.[10]

Kowalski et al. evaluated the feasibility of SOHND in cN1 and cN2a oral SCC patients. In his study patients with cN1 or cN2a at level 1 , upto 54.7% were pathologically N0.[11]

In our study of the 69.5% (75 patients) who were clinically node positive, 40% (30 patients) were clinically N1 and amongst these 40% patients who were clinically N1, 70% (21 patients) had Level IB neck nodes involved clinically. None of the clinically N1 patients with Level IB enlargement had Level V lymph node metastasis. Out of these 40% patients in our study who were clinically N1, 50% (15 patients) were pathologically N0, 20% (6 patients) were pathologically N1 and 30% (9 patients) were pathologically N2.The rest 9 patients with level 2/3 involvement also did not have Level V lymph nodal metastasis in our study .

However Parikh et al (19)in their study of 210 cases did find only amongst 13 patients with cN1 neck and with Level 2/3 lymph nodes clinically involved to have Level v lymph nodal metastasis .

So they concluded that Level 2/3 lymph nodal metastasis clinically may be a predictor of Level V lymphnodal metastasis

In our study out of the 69.5% (75 patients) who were clinically node positive, 60% (45 patients) belonged clinically to the N2 group (cN2).

Of the clinically N2 group,6.7% patients (3 patients) each had single lymph nodes >3cm (cN2a) clinically, with a large majority of these patients is 86.7% (39 patients) who had multiple ipsilateral neck nodes none <6cm (cN2b) and again only 6.7% (3 patients)

had bilateral neck nodes involved clinically with none of the neck nodes being >6cm.

As shown in our study the 45 patients who were clinically N2, 12 were pathologically N0 (pN0), 3 were pN1 and 30 patients were pN2. Among these patients with cN2disease,6 patients had Level V lymph node metastasis.Thus presence of multiple nodes was a risk factor for Level V lymph nodes metastasis in our study.

Davidson et al. in his study has shown that the incidence of level V metastasis in oral cavity cancer was around 3%.[12]

Parikh et al in their study on 210 patients and 226 neck specimens have also shown that the incidence of Level V lymph node metastasis to be 4.3%.[19]

In our study of 108 patients in which 735 Level V lymph nodes were examined, only 6 patients (5.5%) had Level V lymph nodes metastasis.

In our study the patients who had Level V lymph nodes involved were pathologically N2b which correlates with the study by Parikh et.

al who also found patients having Level V lymph nodes metastasis had pN2b disease(19).

John et al. shown in his study that amongst all oral cavity cancers, cancer of tongue and floor of mouth were the most common to have level V metastases.[16] In our study the 6 cancers which caused Level V lymph node metastasis, 4 were tongue cancers and 2 were cancers of floor of mouth.

The presence of ECS of tumour has been explored in numerous studies that demonstrated that tumour extension beyond the capsule of lymph node worsen the prognosis. Johnson et al. reported that <40% of the patients with histological evidence of ECS were free of disease 24 months after therapy.[17] Fertilo et al. has reported that macroscopically recognisable ECS carries a prognosis worse than that of microscopic spread.[18] In our study all patients with HPE suggestive of level V LN metastasis had ECS.

Hence, clinically evident ECS like, LN size>3cm (N2a) and fixed with mandible, skin or adjacent structures, matted multiple lymph nodal mass were considered potential risk factors in our study.

CONCLUSION

In the management of patients with clinically N0 neck SND is the standard of care. In patients with clinically N2 and N3 oral cavity cancers MRND is essential in order to achieve good loco-regional control.

Patients with clinically N1 oral cavity cancer but with level Ib as the only site of clinically palpable lymph nodes, can safely undergo SND in carefully selected patients .

Among patients of oral cavity cancer with clinical N1 disease, but with clinically palpable level II or III cervical it would be prudent to do a MRND instead of SOHND , as there is a high risk of level V lymph node metastasis in such patients.

Potential risk factors for level V lymph node metastases as was evident from our study were : clinically evident extra capsular spread ; lymph node size>3cm, lymph node fixity with surrounding structures like mandible, skin etc, matted lymph nodes, multiple lymph node involvement, and primary site involving tongue and floor of mouth.

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