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# Management of Neck in Oral Squamous Cell Carcinoma

KEYWORDS: Oral Squamous cell carcinoma, Radical neck dissection(RND), Modified Radical neck dissection(MRND), Supra Omohyoid neck dissection(SOHD)

**Dr. Shool Rohit S.**
Senior Resident General Surgery, Department of Surgery, Shrimati Kashibai Nawale Medical College, Narhe, Pune-411041

**Dr. Anand P Zingade**
Associate Professor General Surgery, Department of Surgery, Shrimati Kashibai Nawale Medical College, Narhe, Pune-411041

**Dr. Manish Kumar**
Assistant Professor General Surgery, Department of Surgery, Shrimati Kashibai Nawale Medical College,Narhe, Pune-411041

**ABSTRACT** *Background: Oral Squamous cell carcinoma spreads mainly by lymphatic to regional group of lymph nodes situated in the neck. Neck management strategies are important determinants in management and outcome of oral cancer. Objectives: To evaluated the management strategies for neck in different stages of oral Squamous cell carcinoma. Methodology: Using Ambiceptive observational design 100 cases of oral cancer admitted from Feb 2008 to 2010. Results: 36% patients underwent RND, 18% patients underwent MND, 24% patients underwent SOHD and 22 % patients were selected for observation protocol. 49% patients had well differentiated and 50% patients had moderately differentiated tumors.7 had primary site recurrence, 6 had neck recurrence and 2 had distant metastasis. Conclusion: SOHD remains the preferred neck dissection of well differentiated, early Squamous cell carcinoma of lip and buccal mucosa. RND is a good alternative for N1, N2 and N3 necks. Neck recurrence rates are same for both MND and RND.*

**Introduction:**
Oral Squamous cell carcinoma is the commonest type of oral cancer. It accounts to about 91 percent of all oral malignancies. (1) It consists of cancers arising from the following structures namely oral tongue (30-35%), floor of mouth (20-25%), buccal mucosa (15-20%), alveolus (10-15%), retromolar trigone (8-10%), lip (3-5%), hard palate (2-5%). (1) Oral Squamous cell carcinoma is the sixth most common cancer reported globally with an annual incidence of over 300,000 cases, of which 62% arise in developing countries particularly in south East Asia including India. The age-adjusted rates of oral cancer vary from over 20 per 100,000 population in India (2). Tobacco consumption is the major etiological factor in oral cancer (2).

Oral cancer spreads by local invasion into surrounding tissues infiltrating them as the tumor size grows (3). Blood borne metastasis is very rare in oral cancer 1-3 % (4). It mainly spreads locally and by lymphatics to regional nodes of neck so it considered a loco regional disease. Therefore management of neck nodes is as important as management of primary tumor. Incidence of neck node metastasis changes according to the site of primary tumor .Metastasis is more common in cancers of tongue and alveolus as compared to lip and buccal mucosal cancers (5).

There is debate about less radical surgeries for cancers of low metastatic potential. But tumors of larger size have higher incidence of nodal metastasis these lymph nodal metastasis may be clinically evident or clinically occult. (6) So the debate is whether to observe the neck or to operate.

Earlier it was believed that even for early oral cancer cases radical neck dissection (RND) to remove the lymphatic basins in entirety was mandatory. But it is associated with considerable mortality. (7)

Various studies were undertaken to challenge this concept of radicality of neck dissection (8), (9), (10), these studies compared radical neck dissection with less radical surgeries, or whether to observe the neck with regular follow up.

The present study was planned with the objectives: 1. To find out incidence of neck node metastasis, with regard to different primaries in oral cavity 2. To evaluate different methods of management of neck and its appropriateness by assessing the outcome.

**Materials and Methods:**
The study was conducted at two tertiary care hospitals in a metro city of Western Maharashtra, India. Ambiceptive (retrospective and prospective) observational study design was used. A total of 100 patients of oral cancer admitted in surgery department in the two hospitals from February 2008 to December 2010 were included in the study. Retrospective Information of patient's viz. Clinical history, Site of oral cancer, Histology-grading of cancer, Investigation reports and Neck Management method was obtained from the hospital records.

Management strategies for neck in different stages of oral Squamous cell carcinoma with respect to primary tumor [size, site and grade] and nodal status were studied. Various management modalities that were evaluated for neck included Radical Neck Dissection (RND), Modified Radical Neck Dissection (MND), Selective Neck Dissection [Supra Omohyoid neck dissection (SOHD)] and Observation protocol. Adjuvant modalities of treatment i.e. Radiotherapy and Chemotherapy were also evaluated. Patients underwent follow up at 3 monthly intervals for at least a period of 6 months, so that patients up to December 2010 were included in the study. Outcome analysis was done with regards to recurrence within this period, and its consequences and their respective management were evaluated.

Statistical analysis: The data was analyzed by using SPSS 19.0 (Statistical package for social sciences), MS-Excel.

**Results:**
Highest incidence of oral cancer in the study was between 51-60 years. 73% of oral cancer patients are males. 90 % of all patients are associated with tobacco consumption in different forms. Tongue is the commonest site primary tumor followed by buccal mucosa, alveolus, retromolar trigone, lip and floor of mouth. Table-1

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**Table: 1 Demographic, Clinical and Histopathological Characteristics of Oral cancer patients**

| Characteristics | No. of Patients (n=100) | Percentage |
|---|---|---|
| Age group (Years) | | |
| 31-40 | 16 | 16. |
| 41-50 | 22 | 22 |
| 51-60 | 33 | 33 |
| 61-70 | 16 | 16 |
| 71-80 | 13 | 13 |
| Gender | | |
| Female | 27 | 27 |
| Male | 73 | 73 |
| Tobacco consumption | | |
| Yes | 90 | 90 |
| No | 10 | 10 |
| Site of Primary tumor | | |
| Lip | 4 | 4 |
| Buccal mucosa | 30 | 30 |
| Alveolus | 11 | 11 |
| Retromolar trigone | 6 | 6 |
| Floor of mouth | 2 | 2 |
| Tongue | 47 | 47 |
| Clinical tumor size | | |
| T1 | 28 | 28 |
| T2 | 43 | 43 |
| T3 | 20 | 20 |
| T4 | 9 | 9 |
| Clinical nodal status | | |
| N0 | 68 | 68 |
| N1 | 25 | 25 |
| N2 | 7 | 7 |
| N3 | 0 | 0 |
| Clinical stage | | |
| 1 | 28 | 28 |
| 2 | 26 | 26 |
| 3 | 29 | 29 |
| 4 | 17 | 17 |
| Histo-pathological tumor size | | |
| T1 | 34 | 34 |
| T2 | 41 | 41 |
| T3 | 16 | 16 |
| T4 | 9 | 9 |
| Histo-pathological nodal status | | |
| N0 | 36 | 36 |
| N1 | 26 | 26 |
| N2 | 16 | 16 |
| N3 | 0 | 0 |
| Histo-pathological stage | | |
| 1 | 31 | 31 |
| 2 | 16 | 16 |
| 3 | 29 | 29 |
| 4 | 24 | 24 |
| Grade of tumor | | |
| Well differentiated | 49 | 49 |
| Moderately differentiated | 50 | 50 |
| Poorly differentiated | 1 | 1 |

36% patients underwent RND, 18% patients underwent MND, 24% patients underwent SOHD and 22 % patients were selected for observation protocol. 15 out of 78 (19.2%) patients suffered morbidities of surgery. 49% patients had well differentiated and 50% patients had moderately differentiated tumors. 15 out of 100 patients developed recurrence. 7 out of these 15 patients had primary site recurrence, 6 out of 15 patients. had neck recurrence and 2 out of 15 patients had distant metastasis. Table-2

**Table: 2 Distribution of patients according to Neck management, Morbidities and Recurrence.**

| Neck Management | Number of patients (n=100) |
|---|---|
| RND | 36 |
| MND1 (SAN preserved) | 3 |
| MND 2 (SAN and SCM preserved) | 5 |
| MND 3 (SAN and SCM and IJV preserved) | 10 |
| SOHD | 24 |
| Observation protocol | 22 |
| Morbidities | |
| None | 63 |
| Shoulder dysfunction | 4 |
| Facial edema | 3 |
| Facial asymmetry | 4 |
| Parasthesia | 4 |
| Site of recurrence | |
| Primary site | 7 |
| Neck | 6 |
| Distant metastasis | 2 |
| None | 85 |

Out of 36 patients who underwent RND, 19 [53%] had T3/T4 tumors. But 17/36 [47%] patients with T1/T2 tumor size underwent RND. Out of 18 patients who underwent MND 3 patients [17%] had T3/T4 tumors. 83% patients had T1/T2 Tumors. SOHD was done in 18/24 patients (75 %) in cases of T1/T2 lesions. And 6 out of 24 (25%) patients had T3/T4 tumors. 22 patients underwent observation protocol. 21/22 [95%] had T1/T2 lesions and 1 patients had T3 lesion.Table-3

**Table: 3 Distribution of Neck Management patients according to clinical tumor size, Nodal status, Clinical stage and site of Primary tumor**

| Clinical Characteristics | Neck Management | | | | |
|---|---|---|---|---|---|
| | RND | MND | SODH | Observation | Total |
| Tumor size | | | | | |
| T1-T2 | 17 | 15 | 18 | 21 | 71 |
| T3-T4 | 19 | 3 | 6 | 1 | 29 |
| Total | 36 | 18 | 24 | 22 | 100 |
| Nodal Status | | | | | |
| N0 | 10 | 13 | 23 | 22 | 68 |
| N+ | 26 | 5 | 1 | 0 | 32 |
| Total | 36 | 18 | 24 | 22 | 100 |
| Clinical stage | | | | | |
| 1-2 Early | 6 | 11 | 17 | 21 | 55 |
| 3-4 Late | 30 | 7 | 7 | 1 | 45 |
| Total | 36 | 18 | 24 | 22 | 100 |
| Site of tumor | | | | | |
| Lip | 1 | 3 | 0 | 0 | 4 |
| Buccal mucosa | 8 | 4 | 5 | 13 | 30 |
| Alveolus | 0 | 4 | 2 | 5 | 11 |
| Retromolar trigone | 0 | 2 | 2 | 2 | 6 |
| Floor of mouth | 0 | 0 | 0 | 2 | 2 |
| Tongue | 13 | 11 | 9 | 14 | 47 |
| Total | 22 | 24 | 18 | 36 | 100 |

Out of 36 patients who underwent RND 26 [72%] have N+ (N1&N2) Nodal status.10/36 [28%] patients had of clinically N0 status who underwent RND. Out of 18 patients who underwent MND 5 patients [28%] had N+ status.13/18 [72%] had N0 status. SOHD was done in 23/24 pts (96%) in cases

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N0 clinical status. 1 patient had clinically N1 status. 22 clinically N0 patients underwent observation protocol. Table-3

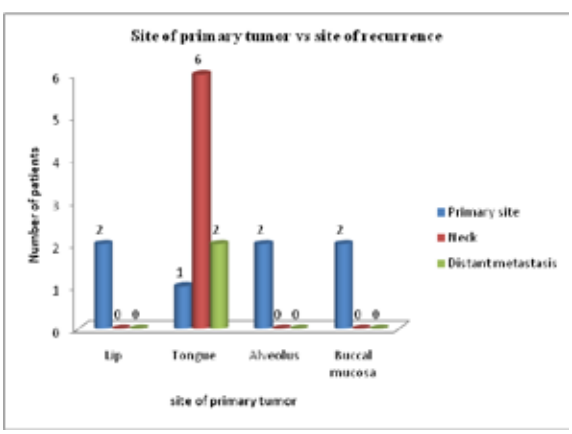
In early stages of oral cancer SOHD was done in 17/24 [71%] patients and Observation of neck was adopted in 21/22 [95%] RND was done in late stages of oral cancer 30/36 [83%] patients MND was done in early cancer in 11/17 [65%] patients. Table-3

**Table 4: Morbidities associated with different neck dissections**

| Type of neck dissection | Morbidities associated with neck dissections | | | | | Total |
|---|---|---|---|---|---|---|
| | Shoulder dysfunction | Facial edema | Facial asymmetry | Parasthesia | None | |
| RND | 4 | 3 | 4 | 4 | 21 | 36 |
| MND | 0 | 0 | 0 | 0 | 18 | 18 |
| SOHD | 0 | 0 | 0 | 0 | 24 | 24 |
| TOTAL | 4 | 3 | 4 | 4 | 63 | 78 |

Recurrences were seen in 2 patients of lip, buccal mucosa and alveolus tumors each and 9 out of 47 tongue cancer patients developed recurrence Tongue had maximum incidence of neck recurrence 6/47 (13%) and 2/47 (4%) distant metastasis. Figure-1

**Figure: 1**




All the morbidities viz. Shoulder dysfunction, Facial edema, Facial asymmetry and Parasthesia were seen in RND cases. Table-4

RND and MND had 0%, SOHD had 12.5% (3/24) and observation protocol had 13. 62 % (3/22); neck recurrence rates. Table: 5

**Table: 5 Recurrence rates in neck with respect to different management modalities for neck**

| Management modality | Rate of neck recurrence | Treatment of recurrence | Whether pt. salvaged |
|---|---|---|---|
| RND /MND | 0% | - | - |
| SOHD | 12.5% | RND done | yes |
| Observation | 13.62% | RND done | yes |

10/12 (83%) patients did not benefit out of neo adjuvant chemotherapy and none of the 4 pts. benefited of neo-adjuvant radiation.38 patients of advanced oral cancer received adjuvant radiation. 8/38 (21%) who received adjuvant radiation developed recurrence of disease. 22 patients of advanced oral cancer received adjuvant chemotherapy .In spite of this 7/22 (32%) patients developed recurrence of disease. 17 Patients of advanced oral cancer received concurrent CT/RT. 6 out of 17 [35%] patients developed recurrence in spite of concurrent CT/RT.

**Discussion:**

Treatment failure and mortality are attributed commonly to recurrence of oral cancer in neck. (11) So the present study focused on management of neck in oral cancer with respect to different management modalities and their outcomes. In the present study out of 100 oral cancer cases 73% were males, 90% are tobacco users and highest number of cases were in the age group 51-60 years. Oral cancer is more common in men than in women. The reported sex differences are attributable to heavier indulgence in risk habits by men (12). In India incidence of oral cancer increase becomes more rapid after age 50 and peaks in the 5th decade. (13) Tongue was the commonest site of oral cancer in the present study.

Out of 36 pts who underwent RND 19 [53%] had T3/T4 tumors. But 17/36 [47 %] tumors were of T1/T2 size underwent RND. No pts who underwent RND developed neck recurrence.

Out of 18 pts who underwent MND 3 pts [17%] had T3/T4 tumors.83% had early tumors. None of the patients developed recurrence in the neck. No morbidity was associated in any patient of MND.

In a retrospective study of 176 patients, Muzaffar (14) found no statistical difference in the incidence of recurrence and disease-free survival between matched cohorts with pathologically N0 necks treated with SND, MRND, and RND.

18/24 patients i.e. 75 % patients who underwent SOHD had T1/T2 lesions. And 25 percent of patients had T3/T4 tumors. . No morbidity was associated in any patient of SOHD.3 out of 24 patients developed neck recurrence. These patients were followed up and were salvaged by RND. These patients had T1/T2 lesions.

22 patients underwent observation protocol of which 1 patients had T3 lesion. 21/22 [95%] had T1/T2 lesions.3 patients out of 22 patients developed neck nodes palpable on follow up. These patients were followed up and were salvaged by RND. Of these patients 2 had T2 lesions and 1 patient who was observed in case of T3 lesion had margin positive on HPE developed neck recurrence

Anderson et al (15) proved that 77% of patients on observation protocol had pathologically adverse findings at time of salvage surgery.49% of these patients had poor prognostic factors in form of poor grade or extra capsular spread.

Morbidities associated with RND are: shoulder dysfunction- 11% facial edema- 8% facial asymmetry-11% parasthesia-11%

In 1961, Nahum et al discovered that patients who had undergone radical neck dissection (RND) commonly experienced shoulder discomfort with limitation of shoulder abduction. (16)

Similarly, in 1952, Ewing and Martin evaluated 100 patients who had undergone RND. Of these patients, 42 experienced shoulder discomfort, and 60 demonstrated shoulder stiffness and decreased range of motion. [17]

**Conclusions:**

Observation of neck is indicated only in N0 neck provided the patient is intelligent enough to understand his own disease and is easily accessible for strict follow up. SOHD is a good staging procedure in N0 neck. It should be preferred if the site, size and grade is favorable. SOHD remains the preferred neck dissection of well differentiated, early Squamous cell carcinoma of lip and buccal mucosa.

RND which was a gold standard for a very long time remains

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a good alternative for N1, N2 and N3 necks. Neck recurrence rates are same for both MND and RND and at the same time MND has got distinctly less morbidity. So MND should be the preferred neck dissection in presence of competent surgical expertise. Both neo-adjuvant and adjuvant Chemo-therapy and radiation have got a limited role to play in oral Squamous cell carcinoma.

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