

# Clinical Significance of Neck Dissection in Post-radiotherapy Clinically Negative N0 Neck in Advanced T3/T4 Oral Malignancies

G Balamurugan<sup>1</sup>, A Suresh Venkatachalam<sup>2</sup>

<sup>1</sup>Associate Professor, Department of Surgical Oncology, Regional Cancer Centre, Government Coimbatore Medical College, Hospital, Chennai, Tamil Nadu, India, <sup>2</sup>Professor, Department of Surgical Oncology, Regional Cancer Centre, Government Coimbatore Medical College, Hospital, Chennai, Tamil Nadu, India

## Abstract

**Introduction:** Optimal therapy for patients with metastatic neck disease remains controversial. Neck dissection following radiotherapy has, traditionally, been used to improve locoregional control.

**Aim:** The aim of the study was to study the neck dissection in post-RT clinically negative neck (cN0) in advanced T3/T4 oral malignancies.

**Materials and Methods:** In this retrospective study, cases of oral squamous cell carcinoma were included from 2014 to 2018. The study includes 16 patients with a cN0. Patients with advanced T stage (T3/T4), the presence of lymphovascular invasion, the presence of perineural invasion, positive surgical margins, lymph node involvement, extracapsular nodal extension, and bone involvement were received post-operative radiotherapy (PORT).

**Results:** A total of 16 cases were included in the study, the PORT was given to six patients where three of them were pN+ and three were pN0 but had adverse features of primary tumors that mandate PORT. The regional recurrence had occurred in 1 case which was pN+.

**Conclusion:** Tumor recurrence was not influenced statistically with the use of PORT in the cN0.

**Key words:** Clinical negative neck, Elective neck dissections, Neck dissections, Oral cancer, Squamous cell carcinoma

## INTRODUCTION

The oral cavity is the predominant site in the head and neck region for the occurrence of primary malignant tumors and they are the leading cause of morbidity and mortality among all cancers across the globe and in India. The incidence of oral cancer is approximately 300,000 cases reported annually worldwide, 92% of which are squamous cell carcinomas (SCC)<sup>[1]</sup> and two-thirds of the occurrences were in men.<sup>[2]</sup> The anatomical subsites of cancer in the oral cavity are tongue – anterior two-third or posterior one-third (50%

incidence), cheek (20–25%), floor of the mouth (10–15%), and gums (10%), other sites were the lips, alveolar ridge, hard palate, and retromolar (trigone) region.<sup>[1,3]</sup>

The general consensus in the head and neck oncology field states that the most appropriate initial line of the management of these tumors is surgical extirpation along with adjuvant treatment such as radiotherapy and chemotherapy.<sup>[4]</sup> Oral cancers have a high propensity for metastasis into the regional lymph nodes. In a study by Won II Jang *et al.*, in 2008, 35%–57% of the patients with oral SCC (OSCC) with clinical staging T1 and T2 and clinically negative lymph nodes N0 had occult nodal metastasis at the time of surgery and the patients who had neck recurrence after the first line of treatment eventually died of uncontrolled neck disease in spite of postoperative radiation therapy (PORT). This suggested an argument in favor of elective neck dissection (END) in patients with clinically N0 oral cancer.<sup>[5]</sup>

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**Corresponding Author:** Dr. A Suresh Venkatachalam, Department of Surgical Oncology, Regional Cancer Centre, Government Coimbatore Medical College, Hospital, Chennai, Tamil Nadu, India.

The survival rates of patients with cervical lymph node metastasis is poorer (44%–71%) when compared to the survival rates of patients without nodal metastasis (86%–95%)<sup>[6]</sup> and there are studies conducted to find out the extent to which END can be outlined as a treatment modality in clinically negative neck (cN0) patients.<sup>[7]</sup> The classical approach to clinically positive metastatic lymph nodes is radical neck dissection (RND), but in a cN0 the occult lymph nodes vary in terms of size, thickness, and extension of the primary tumor.<sup>[8,9]</sup> Head and neck oncologists suggest that patients with occult nodal metastasis should undergo surgery or RT rather than observation to minimize associated morbidity.<sup>[10]</sup>

### Aim

The aim of the study was to study the neck dissection in post-RT cN0 in advanced T3/T4 oral malignancies.

## MATERIALS AND METHODS

In this retrospective study, cases of OSCC were included from 2014 to 2018. The study includes 16 patients with the cN0 and those treated by SOHND (removal of cervical nodal Levels I, II, and III) or extended SOHND (removal Level I through IV) if the primary tumor was in the tongue. The END was only performed if there was a 15–20% chance of occult neck disease (tumor thickness >4 mm, poorly differentiated SCC, tumor T stage >T1, or the neck is hard to assess). Patients with advanced T stage (T3/T4), the presence of lymphovascular invasion, the presence of perineural invasion, positive surgical margins, lymph node involvement, extracapsular nodal extension, and bone involvement were received post-operative radiotherapy (PORT). The PORT was not given to N1 with any capsular spread. All patients were diagnosed with OSCC after comprehensive examination, including history (medical, family, dental, and social), clinical examination, radiological, and histopathological examination to evaluate the clinical staging and patient fitness to any proposed treatment. An inclusion criterion was previous untreated patients with SCC of the oral cavity. The patients with non-squamous malignancy, prior treatment with surgery, radiotherapy, and chemotherapy were excluded. The patients classified according to age, sex, primary site, clinical (pretreatment), and pathological (postsurgical histopathological) staging.

## RESULTS

A total of 16 patients with OSCC underwent resection of the primary tumor with elective/therapeutic neck dissections. 72% of patients were male; the mean age of the study group was 46.28 years. The tumor sites were the tongue (10 cases, 62.5%), the gingiva (2 cases, 12.5%), the floor of mouth

(2 cases, 12.5%), and the retromolar region (2 cases, 12.5%). According to T classification T3 and T4, 16 cases were noted [Table 1]. According to metastatic lymph node level, the highest incidence of histopathologically positive lymph node level was Level I. The PORT was not given to N1 with any capsular spread. According to these criteria, the PORT was given to six patients where three of them were pN+ and three were pN0 but had adverse features of primary tumors that mandate PORT. The regional recurrence had occurred in 1 case which was pN+ [Table 2].

## DISCUSSION

The oral cavity has a rich network of lymphatic drainage, and the risk of nodal metastasis in any stage of OSCC lies between 19% and 57%. This nodal spread can remain subclinical or occult at the time of diagnosis and creates controversy in deciding on the appropriate neck treatment.<sup>[11,12]</sup> In spite of the use of diagnostic modalities such as computed tomography, magnetic resonance imaging, ultrasonography, and fine-needle aspiration cytology micrometastases can still be present in clinically N0 cases within the nonpalpable neck nodes.<sup>[13]</sup> This explains the low sensitivity with these imaging techniques. The rates of occurrences of occult nodal metastasis in T3 and T4 stage patients are 90% and 60%, respectively, according to literature. The commonly used tumor, node, and metastasis classification system often underestimates the exact size and measurements of the tumor including diameter, length, width, area, volume, and tumor thickness.<sup>[14]</sup>

In general, RND (removal of Level I to VI nodes along with nonlymphatic structures – sternocleidomastoid muscle, IJV, accessory nerve (XI), submandibular salivary gland, and cervical sympathetic plexus) or modified RND (where the nonlymphatic structures are spared) is used in clinically positive neck (cN+), and selective neck dissection (SND) (SOHND – removal of Levels I, II, and III where any of the lymphatic compartment is preserved) is indicated in cN0.<sup>[3]</sup> In tongue carcinoma, the level is extended to IV as skip metastasis may be present. Stage III and Stage IV cancers need adjuvant radiotherapy and chemotherapy.

The three existing treatment options for cN0 patients who are at significant risk of occult metastasis are wait and watch policy – where neck dissection is reserved for those who develop regional metastasis later following the treatment of a primary tumor, elective neck irradiation, and END. The regional recurrence rates of cN0 patients were 2%–8% for elective neck radiation and 2%–11% for END.<sup>[15]</sup> The prime objective of this study is to analyze the recurrence rates in cN0 in T3 and T4 cases and how PORT helps in decreasing the recurrences. This problem could be

**Table 1: Clinical T and N staging**

Clinical stage	cN0	cN1	cN2a	cN2b	cN2c	cN3	cNx
cT3	4	1	1	1	1	1	0
cT4	2	1	2	1	0	1	0

cNo: Clinically negative neck

**Table 2: Recurrence according to the type of neck dissection**

Neck dissection	Surgery only	Surgery with post-operative radiation therapy
Supraomohyoid neck dissection		
Recurrence	2	1 (regional)
Cure	8	5

easily solved if it was possible to predict the risk of neck metastasis.<sup>[16]</sup> Various studies state that the recurrence rates of the pathologically negative neck are (pN0) 3–7%.<sup>[17-19]</sup>

The limitations of this study are its retrospective design which limits the analysis, heterogeneity of approach and the aggressive nature of the disease which can lead to the death of the patients. Hence, the surgeon should use their clinical judgment to be more or less selective in neck dissection and adjust treatment considering the patient's tolerance, risk, and benefit of surgery and the aggressiveness of the tumor. PORT can be given to treat perineural invasion, extracapsular spread, vascular invasion, and treatment of positive margins. The surgeon must also understand that incomplete removal of metastasized lymph nodes can cause recurrence in spite of RND. Hence, it is inferred that tumor recurrence is not controlled by PORT following RND, SND, or END in clinically negative cN0 advanced stage of oral malignancy and recurrence can still occur despite treatment due to the presence of occult lymph nodes. Due to the morbidity of salvage therapy and the limited chances of cure the oncologist must cautiously counsel the patients who contemplate treatment of recurrent cancer after therapy for the advanced stage.

## CONCLUSION

Tumor recurrence was not influenced statistically with the use of PORT in the cN0.

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