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Can neck irradiation be an alternative to neck dissection in early stage carcinoma oral tongue operated for primary alone? Experience from a single institute

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Original Article

Abstract

Purpose: To study pattern of failure, locoregional control rates (LCR) and disease free survival (DFS) in post-operative patients of carcinoma oral tongue, and to study the impact of nodal dissection on DFS in stage I and II patients. **Methods:** 102 patients of carcinoma oral tongue treated between January 2009 and December 2013 were analyzed. All patients were operated for primary disease, but neck dissection was done in 78 (76.5%) patients only. However, radiation to primary site along with neck region was received by all patients. Pattern of failure, LCR and DFS were estimated. **Results:** At median follow up of 12 months, 10.8% patients failed locally, 10.8% in nodal region, 2.9% both at local and nodal site, and 5.9% patients failed distally. 2 year LCR and DFS was 71.2%, 90.9%, 79.5%, 0% and 55.2%, 64.4%, 57.8%, 0% in stage I, II, III, IV respectively. 2 year DFS in stage I patients, who underwent nodal dissection and post-operative radiation (14 patients) was 64.3% and in whom only neck irradiation was done (15 patients), it was 45.8%, however difference was not significant (p = 0.5). But in stage II patients, 33 patients who underwent nodal dissection and post-operative radiation, 2 year DFS was 85.4% and it was 21.4% in 7 patients who underwent neck radiation only, and difference showed trend towards significance (p = 0.05). 2 or more positive lymph nodes post dissection was the only poor prognostic factor that correlated with DFS (p = 0.02) **Conclusion:** While in stage I, neck irradiation alone can be a possible alternative to neck dissection and post-operative radiation; for stage II, neck dissection is mandatory.

Keywords: Carcinoma Oral Tongue; Disease Free Survival; Nodal Dissection; Neck Irradiation

1. Introduction

Tongue cancer accounts for 25 to 40% of oral squamous cell carcinomas.[1] Being a highly muscularized structure and having rich lymphatic network, tongue cancer is predisposed for early lymph node metastasis. As such, lymph node metastasis, both occult and manifest, are observed more commonly in oral tongue cancer than in any other cancer of the oral cavity.[2] Over the years, the management of early stage tongue cancer (clinical tumor classification [cT] cT1 - T2 N0 M0), has seen a major change, both for the primary local disease, as well as for the neck nodes. Interstitial brachytherapy has been used widely for early stage disease, in place of wild local excision or partial glossectomy, in an attempt to preserve the organ. However elective neck dissection in early stage disease, has been a source of debate in recent years.[3, 4]

Spiro and Strong analyzed 314 patients (1957 - 1963) of tongue cancer, in whom neck dissection was not done, and demonstrated an overall 5-year survival rate of 42%

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only.[5] Franceschi *et al*. in a study conducted in 297 patients (1978-1987) of oral tongue cancer demonstrated an improved overall 5-year survival rate of 65%, which was related to a more aggressive treatment of the neck even in early tumour stages and to adjuvant radiotherapy in advanced tumour stages.[6]

However, there is limited literature on the efficacy of neck irradiation in controlling the occult lymph node metastasis from early stage carcinoma tongue, when neck dissection has not been done. Most of the data can be extrapolated from the survival benefits achieved by chemoradiation in patients with carcinoma oropharynx, where neck irradiation has shown results similar to nodal dissection in controlling the neck disease.[7]

The purpose of the present study was to describe our experience with surgical based therapy of tongue cancer during the last five years. Also, whether in early stage patients (stage I and II), neck dissection can be replaced by neck irradiation or not, has been discussed. Furthermore, prognostic factors for survival were analyzed in order to obtain valid criteria for therapeutic decision-making in clinical routine.

2. Methods and Materials

2.1. Patients

Between January 2009 and December 2013, one hundred and two post-operative patients of stage I – IV A carcinoma tongue, registered and further treated at our radiation oncology department were analyzed. Patients had Karnofsky performance status > 70 and adequate haematologic (haemoglobin > 10 gm/dl, absolute neutrophil count > 1500/dl, platelets > 100,000/dl), hepatic and renal function (calculated creatinine clearance > 60 mL/min). Exclusion criteria included inoperable cases due to disease extension or medical comorbidities, stage IV - B disease, previous treatment with RT or chemotherapy, any prior or synchronous malignancy, hypersensitivity to platinum agents and serious medical disease or pregnant state.

2.2. Surgery type

All 102 patients underwent surgery for local primary disease, wide local excision (WLE) (56 patients), hemiglossectomy (33), total glossectomy (2), WLE plus segmental mandibulectomy (10), total glossectomy plus segmental mandibulectomy (1); but only 78 (76.5%) patients out of them had underwent neck dissection also, for nodal control. The neck dissection done was ipsilateral (I/L) radical neck dissection (RND) in 15 patients, I/L modified neck dissection (MND) in 20, I/L supraomohyoid neck dissection (SOND) in 32, I/L RND plus contralateral (C/L) MND / SOND in 2 , and I/L MND plus C/L MND/SOND in 9 patients. It is worth mentioning that in the Otolaryngology department of our institute, all patients of early stage (I and II) oral tongue cancer are managed by elective neck dissection along with the treatment of the primary disease. But 26 patients (25.5%) already had undergone surgery for primary disease outside the institute, and the neck was not addressed in 24 patients out of them (all these 24 patients were early stage). Such patients when referred to our institute, are not sent for second surgery in the form of neck dissection, but are managed by elective neck irradiation at our department of radiation oncology.

Therefore, all patients irrespective of neck dissection done or not, were planned with local radiation to primary as well as neck region post operatively. Indication for giving post-operative radiation in these patients was inadequate dissection, pathological pT2, 3, 4, high risk features like poor differentiation, margin positivity, depth of invasion > 4mm, extracapsular extension and node positivity. All the clinically node negative early stage (I, II) patients (T1, 2 N0 M0) who underwent surgery for primary disease alone, were given elective neck irradiation, considering non neck addressal to be inadequate surgery in these patients.

2.3. Radiation technique and dose

Patients were simulated on Simulator CT (Phebus Mecaserto, France) after immobilisation with a thermoplastic mould and treated with either Co - 60 c - rays or 6 MV photons. Patients were treated by parallel-opposed lateral portals without any tissue compensators. Neck nodes were treated electively in all patients who received external radiation. Regarding dose, 40 Gy was delivered in 20 fractions in 4 weeks to the primary and draining lymph nodes (phase I), followed by 10 Gy in 5 fractions in 1 week after sparing the spinal cord (phase II). Additional 10 Gy in 5 fractions in 1 week was given in the presence of high risk features. Therefore, the dose up to 50 Gy in 25 fractions was given to nodal region only in those patients, who were early stage I and II clinically and also had pathologically uninvolved necks. Rest all patients were planned up to 60 Gy in 30 fractions.

Patients with 2 or more lymph nose positivity and those with extracapsular extension were planned with chemoradiation (CRT). In these patients, concurrent single agent cisplatin, 100 mg/m^2 intravenously was administered on days 1, 22 and 43 of the radiation schedule after proper hydration. Radiation was administered within 2h after the cisplatin administration. A complete haemogram and renal function tests were done before every cycle of cisplatin. Chemotherapy was withheld in cases of any grade 2 or more haematologic or renal toxicity, till the normal values were recovered after specific management.

2.4. Follow up

Patients were monitored for mucosal and skin reactions at least weekly during radiotherapy. The first clinical follow up was scheduled at 6 weeks and thereafter every

two months for the first year and then quarterly. Chest X-rays were obtained at 6 months intervals. Recurrence at local or nodal site was considered as local or regional failure from day zero. Fine needle aspiration cytology or a biopsy was carried out to document a recurrence in clinically suspicious cases.

2.5. Statistical analysis

In this retrospective study, frequency tables with counts and percentages were used to describe pre-treatment and treatment characteristics of the patients. Actuarial disease free survival (DFS) and overall survival (OS) rates were calculated by the Kaplan – Meier method and stratified by stage groups. The survivals were compared between early stage patients on the basis of nodal dissection, using log - rank test. Exploratory subgroup analysis was carried out on various prognostic variables. The relationship between the clinic pathologic variables and survival was assessed in univariate analysis using the log rank test. For multivariate analysis, the Cox proportional hazard model was used. A p-value of < 0.05 was taken as significant. Data were analyzed using the statistical software SPSS for windows (version 19.0).

3. Results

3.1. Patient cohort and characteristics

Table 1 shows the profile and treatment details of the treated patients. Out of 102 patients with median age of 48 years (range: 24-83 years), 29 (28.4%) patients were stage I, 40 (39.2%) were stage II, 25 (24.5%) were stage III, and 8 (7.8%) were stage IVa. 74.5% of the total patients were operated at our institute, rest were operated outside. All 102 patients underwent surgery for local primary disease, but only 78 (76.5%) patients out of them had underwent neck dissection also, for nodal control. All patients however had received postoperative radiation to the primary as well as neck region.

3.2. Early stage, clinically node negative, but pathologically node positive

Out of 29 stage I patients, only 1 (3.4%) was pathologically node positive, but out of 40 stage II patients, 16 out of 33 patients who underwent neck dissection (40% of stage II) were pathologically node positive. This clearly indicates the definite need for neck addressal even in early stage patients. Table 2 shows the postoperative histopathological features among the patients.

3.3. Adjuvant treatment

Post operatively, 78 (76.4%) patients were treated by external beam radiation therapy and 22 (20.6%) patients received chemoradiation. Rest 2 (2%) patients were treated with radiation and brachytherapy boost.

3.4. Pattern of failure

At 12 month median follow up period, 31 (30.4%) patients failed. Table 3 shows the pattern of failure among these patients and the stage to which they belong.

Table 1: Patients' profile and treatment details.

Characteristics	Number of patients (percentage)
Gender	
Male	73 (71.6%)
Female	29 (28.4%)
Age(years)	
Median	48
Range	24 – 83
Tumor laterality	
Right	51 (50%)
Left	48 (47%)
Tip	3 (3%)
T stage	
T1	33 (32.4%)
T2	49 (48%)
T3	15 (14.7%)
T4a	5 (4.9%)
N stage	
N0	83 (81.4%)
N1	15 (14.7%)
N2a	4 (3.9%)
TNM stage	
I	29 (28.4%)
II	40 (39.2%)
III	25 (7.8%)
IVa	8 (7.8%)
Treatment	
Sx ---> RT	78 (76.4%)
Sx--->RT + BT	2 (2%)
Sx --->CRT	22 (21.6%)
Sx place	
Our institute	76 (74.5%)
Outside	26 (25.5%)
Sx type	
WLE	56 (55.4%)
Hemiglossectomy	33 (32.4%)
Total glossectomy	2 (2%)
WLE + segmental mandibulectomy	10 (9.8%)
Total glossectomy + segmental mandibulectomy	1 (1%)
Neck dissection	
Yes	78 (76.5%)
No	24 (23.5%)
Type of neck dissection	
I/L RND	15 (14.7%)
I/L MND	20 (19.6%)
I/L SOND	32 (31.4%)
I/L RND +C/L MND/SOND	2 (2%)
I/L MND + C/L MND/SOND	9 (8.8%)

Table 2: Patients' post-operative histopathological detail.

Characteristics	Number of patients (percentage)
Histopathology	
Squamous cell carcinoma	100 (98%)
Adenocarcinoma	1 (1%)
No residual	1 (1%)
Differentiation	
Well	70 (68.6%)
Moderately	29 (28.4%)
Poorly	2 (2%)
Depth of invasion	
>4 mm	
Yes	65 (63.7%)
No	36 (35.3%)
Superior margin	
Involved	1 (1%)
free	100 (98%)
Inferior margin	
Involved	13 (12.7%)
Free	79 (77.5%)
close	9 (8.8%)
Anterior margin	
Involved	1 (1%)
Free	94 (94.1%)
close	4 (3.9%)
Posterior margin	
Involved	4 (3.9%)
Free	94 (92.2%)
close	3 (2.9%)
Medial margin	
Involved	6 (5.9%)
Free	92 (90.2%)
Close	3 (2.9%
Lateral margin	
Involved	2 (2%)
Free	98 (96.1%)
Close	1 (1%)
Margin positivity	
Involved	19 (18.6%)
Free	83 (81.4%)
LVI	
Involved	8 (7.8%)
Free	93 (91.2%)
ECE	
Present	8 (7.8%)
Absent	93 (91.2%)
Number of positive LN	
0	47 (46.1%)
1	14 (13.7%)
2	5 (4.9%)
3 or more	12 (11.8%)
Nodal status according to stage	
T1: Clinically N0, but pN+	1 out of 29 (3.4%)
T2: Clinically N0, but pN+	16 out of 40 (40%)

Table 3: Pattern of failure.

Failure type	Number of patients (percentage)	Stage wise failures Stage (Number of patients failed)
Local	11 (10.8%)	I (7) II (1) III (1) IV (2)
Lymph nodal	11 (10.8%)	I (2) II (5) III (4)
Local +lymph node	6 (5.9%)	I (2) II (1) III (3)
Distant	3 (2.9%)	I (1) II (2)

Loco - regional control rates and survival rates (Figure 1a, 1b, 1c, 1d, 1e)

2-year overall Local control (LC) rate combined for all stages was 71.9%, nodal control rate was 69.2%, DFS was 55.3% and OS was 59.1 %.

The Kaplan – Meier estimate yielded 2-year LC rate of 71.2%, 90.9%, 79.5% and 0% in stage I, II, III and IV respectively. 2 year DFS for stage I, II, III and IV was 55.2%, 64.4%, 57.8% and 0% respectively. The OS for stage I, II, III and IV was 63.9%, 66.4%, 53% and 0% respectively.

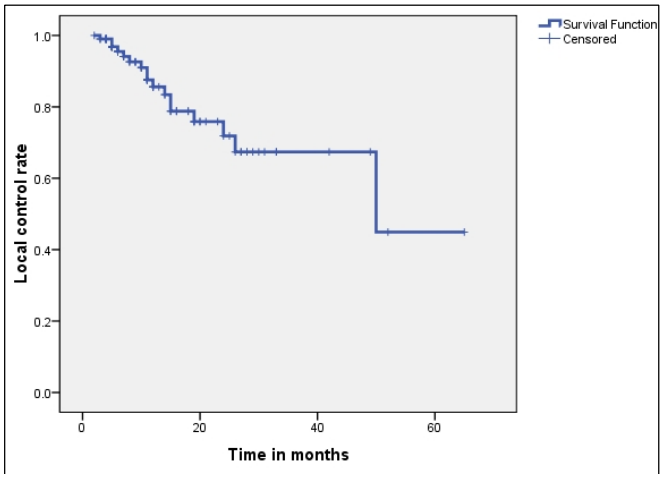

Figure 1a: 2-year Local control rate.

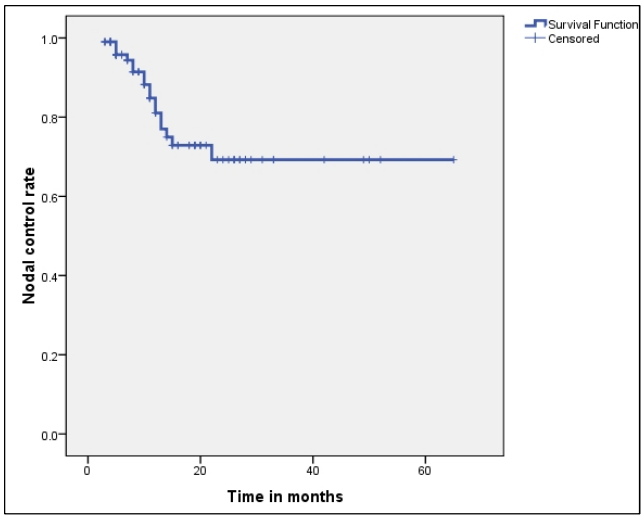

Figure 1b: 2-year Nodal control rate.

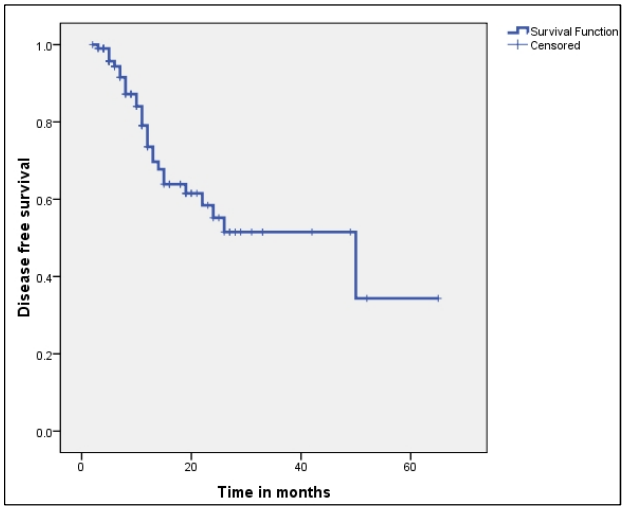

Figure 1c: 2-year Disease free survival.

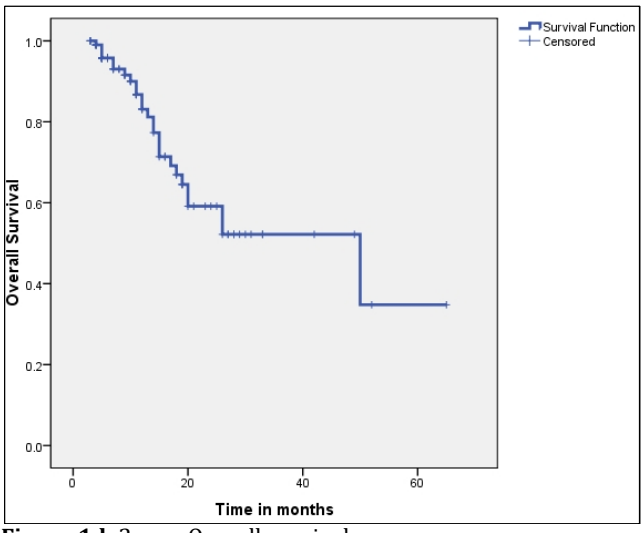

Figure 1d: 2 year Overall survival.

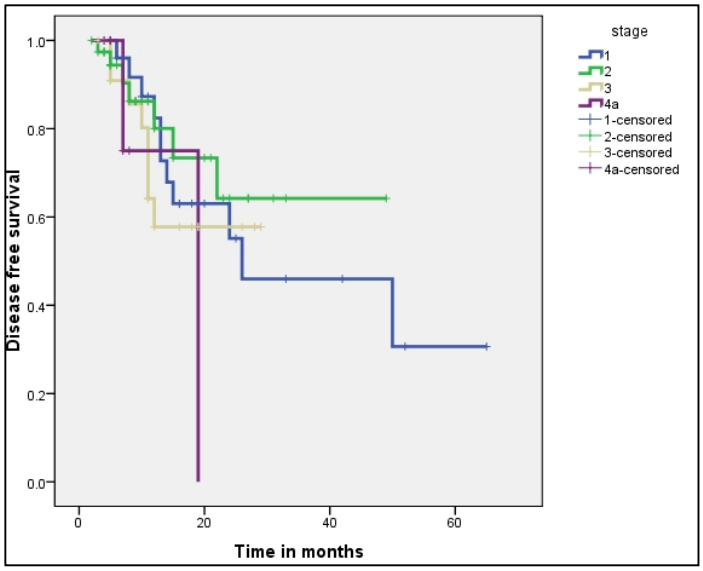

Figure 1e: Stage wise 2-year disease free survival.

Nodal failure rate and DFS in stage I patients based on nodal dissection (Figure 2a, 2b)

As shown in table 4, the 2 year nodal failure rate in stage I patients who underwent neck dissection, were pN0 and underwent postoperative radiation [14 patients] was 17.5% , and it was 37.5% in those stage I patients in whom no neck dissection was done, but neck irradiation was done [15 patients]) (p = 0.4; HR - 0.46, 95% CI-0.07-2.79). The 2-year DFS in stage I patients was 64.3% (who underwent neck dissection and post-operative radiation) and 45.8% (in whom no neck dissection, but neck irradiation was done) (p = 0.5; HR - 0.66, 95% CI - 0.19 - 2.28). This indicated that there is a definite need for neck addressal in stage I patients. However, the results with neck radiation alone are not statistically different from neck dissection plus neck irradiation.

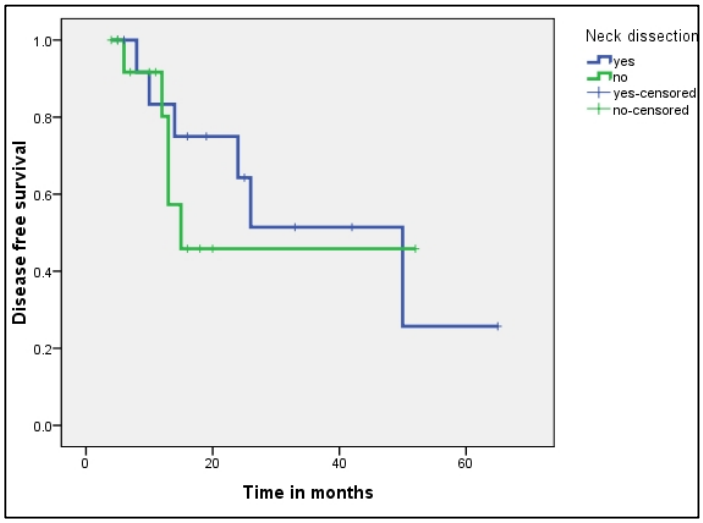

Figure 2a: Disease free survival in stage I patients based on neck dissection.

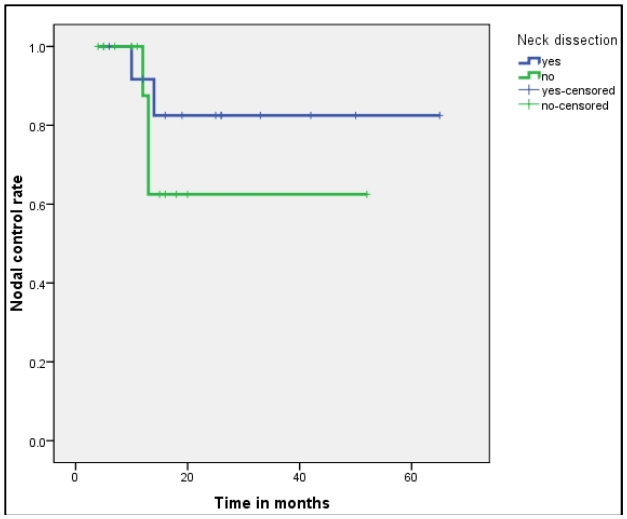

Figure 2b: Nodal control rate in stage I patients based on neck dissection.

Nodal failure rate and DFS in stage II patients based on nodal dissection (Figure 3a, 3b)

As shown in table 5, the 2 year nodal failure rate in stage II patients who underwent neck dissection, were pN0 and underwent postoperative radiation [33 patients] was 14.6% , and it was 71.4% in those stage II patients in whom no neck dissection was done, but neck irradiation was done [7 patients]) (p = 0.1; HR - 0.29, 95% CI - 0.05 - 1.46). The 2 year DFS in stage II patients was 85.4% (who underwent neck dissection and post-operative radiation) and 21.4% (in whom no neck dissection, but neck irradiation was done) (p = 0.05; HR - 0.23, 95% CI - 0.05 - 1.03). This indicates that neck dissection is mandatory in stage II patients, and neck irradiation alone cannot be an alternative to neck dissection in stage II patients.

Table 4: Outcome in stage I patients based on nodal dissection plus radiation versus only radiation.

	Nodes dissected Pathological node negative (pN0) Post-operative radiation given	Nodes not dissected Clinical node negative (cN0) Radiation given	*P*-value
2 year nodal failure rate	2 out of 14 (17.5 %)	5 out of 15 (37.5 %)	0.4
2 year DFS	9 out of 14 (64.3 %)	7 out of 15 (45.8 %)	0.5

Table 5: Outcome in stage II patients based on nodal dissection plus radiation versus only radiation.

	Nodes dissected Pathological node negative (pN0) Post-operative radiation given	Nodes not dissected Clinical node negative (cN0) Radiation given	*P*-value
2 year nodal failure rate	5 out of 33 (14.6 %)	5 out of 7 (71.4 %)	0.1
2 year DFS	28 out of 33 (85.4%)	2 out of 7 (21.4 %)	0.05

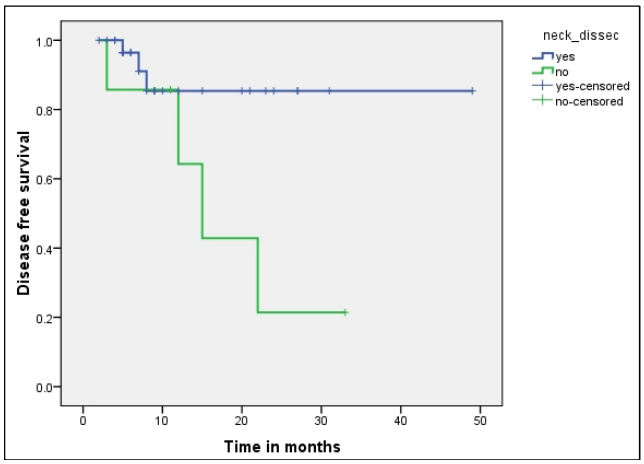

Figure 3a: Disease free survival in stage II patients based on neck dissection.

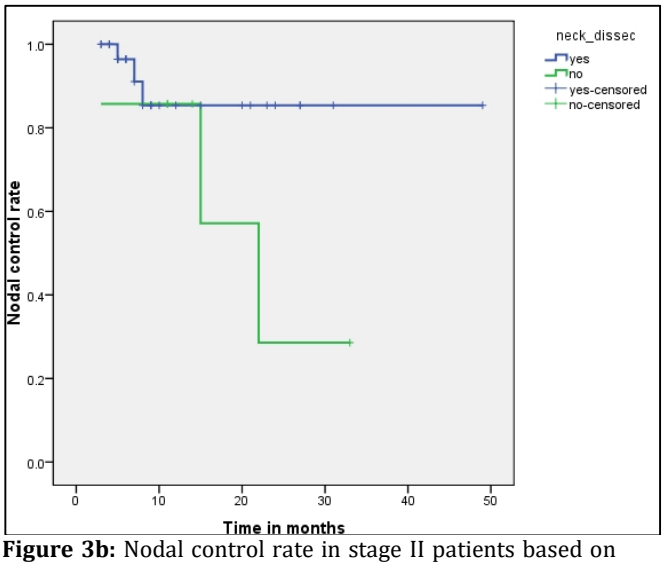

Figure 3b: Nodal control rate in stage II patients based on neck dissection.

3.5. Prognostic factors for survival

In univariate analysis (log rank), the p N status (p = 0.07) and neck dissection (p = 0.08) showed trend towards significance, and were identified as prognostic factors for disease free survival after treatment. Tumour site (p = 0.0.81), pT - status (p = 0.31), stage (p = 0.55), grading (p = 0.38), depth of invasion > 4mm (p = 0.80), number of lymph node metastases > 2 (p = 0.25), extracapsular spread (p = 0.67) and clear margins (p = 0.64) did not show significant values.

However, p N status was significantly correlated to nodal disease free survival in the univariate analysis (p = 0.03). However, in multivariate analysis (Cox proportional hazard model), the only variable which had significant correlation to the disease free survival was the number of positive lymph nodes > 2 post dissection (p = 0.02).

3.6. Attempt for salvage therapy

All recurrences were verified histologically, unless obvious by clinical examination. In patients with residual tumour, disease recurrence, or progression of disease, salvage surgery or palliative treatment was offered, depending on the status of the individual patient, their symptoms and previous treatment.

Among the 11 local recurrences, 6 patients were planned for total glossectomy, but only 4 underwent the same (3 patients out of these also received radiation post surgery) and rest were lost to follow up. 5 patients were planned for palliative chemotherapy, but only 1 could receive the same, rest were lost to follow up.

Among the 11 patients who had isolated nodal failures, 2 patients underwent radical neck dissection, 4 patients who either already had neck dissection or had inoperable lymph node relapse, received radiation (with or without chemotherapy), 1 patient was planned with palliative chemotherapy and rest were lost to follow up.

Out of 6 patients who had both local and lymph node relapse, only 2 received palliative chemotherapy, and rest were suitable for best supportive care only. Out of 3 patients with distant relapse, only one received palliative chemotherapy, 2 others were given best supportive care.

4. Discussion

Tongue is the most common subsite for squamous cell carcinoma of oral cavity, accounting for 25 – 40% of total oral cancers.[1] Among the total cases of carcinoma oral tongue, 30% are early stage and nearly 70% are advanced stage.[2,3] Despite the development of multimodal treatment options, the prognosis remains relatively poor.

In a retrospective study, conducted by Kokemueller in 341 patients with squamous cell carcinoma of the tongue, between 1980 and 2009, it was found that local and regional failures occurred in 23.9% and 20.4% patients respectively, leading to a total failure rate of 37.2% after an average duration of 1.6 years.[8] N - Status, extracapsular spread and clear margins were identified as the dominant factors for survival, which was calculated to be 54.5% after 5 years.

Almangush *et al.* analyzed 479 patients with early-stage (cT1 - 2N0) oral tongue squamous cell cancer.[9] Depth of invasion (DOI) and worst pattern of invasion (WPOI) were the strongest pathological predictors for locoregional recurrence, with a hazard ratio for 4 mm DOI of 1.67 (95% confidence interval (CI) 1.07 – 2.60) and HR for WPOI of 1.46 (95% CI 0.95 – 2.25). In addition, mortality was also predicted by DOI (HR 2.44, 95% CI 1.34 – 4.47) and by WPOI (HR 2.34, 95% CI 1.26 – 4.32). The study suggested that clinically early-stage oral tongue carcinomas 4 mm or deeper, or with a growth pattern of small cell islands or satellites, should be considered as high - risk tumors which require multimodality treatment. Review of thirteen retrospective studies by Andres *et al.* to address the role of adjuvant radiotherapy for patients with perineural invasion, showed that large nerve or multifocal perineural invasion may predict worse outcome and may be a more appropriate indication for adjuvant therapy.[10]

In our study, pN status (p = 0.07) and neck dissection (p = 0.08) showed trend towards significance in univariate analysis (log rank), and were identified as prognostic factors for disease free survival. p N status was also significantly correlated to nodal disease free survival in the univariate analysis (p = 0.03). In multivariate analysis, the only variable which had significant correlation to the disease free survival was the number of positive lymph nodes > 2 post dissection (p = 0.02)

The overall locoregional recurrence rates as described by the studies in literature range between 16 and 42%.[11 - 16] But in our study, stage I patients had higher local recurrences after wide local excisions, as compared to the other stages, which is unusual. It was found out that all these patients had undergone surgery for the primary disease from outside the institute. Therefore the comment could not be made on the adequacy of dissection. This is also the reason why overall local control rates and disease free survivals are lesser in stage I compared to stage II. Similarly, the overall survival rate of our patients with tongue cancer is lesser than the survival rates described by other authors, which are quoted between 40 and 65%.[5, 6, 17]

Early stage carcinoma tongue patients (T1 T2 N0M0) generally have good survival. Ganly *et al.* showed that 5-year disease - specific and overall survival rate was

86% and 79% respectively.[18] The management for such patients includes treatment for the primary site and that of the cervical lymph nodes. For the treatment of primary local site, surgery and brachytherapy are the widely used options. However, the management of patients with clinically negative nodes (N0) with early tongue cancer is controversial. There has been a debate whether such patients should be kept on follow up or should undergo elective neck dissection or only local radiation to neck without neck dissection would suffice. Those who favor wait and watch policy argue that 80% of patients with N0 neck would be over treated, and subjected to additional morbidity and costs. Weiss *et al.* suggested that elective neck dissection is necessary if the incidence of occult metastasis is greater than 20%.[19] It is generally accepted that cancer of the oral tongue often shows lymph node involvement even in early stages .The proportion of occult metastases is quoted between 24 and 42%.[20, 21, 22] Even in our study, 40% of the stage II patients who were clinically node negative, were found to be pathologically node positive after neck dissection.

Two randomized controlled trials (RCTs) performed to compare elective neck dissection with observation alone, did not find any survival difference between the two arms and tumor depth of > 4 mm was associated with higher rates of involved nodes and suggested that these set of patients may benefit from elective neck dissection.[23,24] However, both these RCTs had small numbers and consisted of methodology flaws, so their results could not be applied clinically.

In our part of the world, where patient compliance for follow up is poor, "wait and watch" policy for early stage carcinoma tongue patients (operated for primary alone), can be disastrous. Therefore, all these patients are taken up for post-operative radiation to primary and neck at our institute.

Till date, there is no study in literature which has prospectively compared elective neck dissection to neck irradiation alone in early stage patients of carcinoma tongue. However there are some retrospective studies which have analyzed the role of post-operative radiotherapy pT1 - T2 N0 deep tongue cancers. Gokavarapu *et al*. analyzed 103 patients primary pT1 - T2 N0 oral tongue cancer of depth of invasion 4 mm or greater treated surgically from January 2010 to December 2012.[25] 62 patients received post-operative radiotherapy (PORT) and 41 patients did not receive the same; median period of follow - up was 41.3 months. Logistic and Cox regression models showed no significant difference in locoregional recurrences (P = .078) and survival (P = 0.339) between patients who received PORT and those who did not receive PORT.

In the present study also, no significant impact of depth of invasion was found on the loco - regional recurrences and survival. However, by determining stage wise loco - regional and disease free survival rates, the present study was able to find out whether neck irradiation alone could replace the elective neck dissection and postoperative radiation in early stage I and II carcinoma tongue patients.

Our results show that out of 29 clinically node negative stage I patients, only 1 was pathologically positive. The 2 year disease - free survival in stage I post-operative patients of carcinoma tongue, who underwent nodal dissection and post-operative radiation was 64.3% and in those in whom nodal dissection was not done, but radiation was given, it was 45.8%, and the difference was not statistically significant (p = 0.5). This indicates that neck addressal is mandatory, however neck irradiation can be considered as an alternative to neck dissection for stage I patients of carcinoma tongue. But for stage II patients, it was found that 2 year DFS was higher in patients who had undergone neck dissection and post-operative radiotherapy, compared to neck irradiation alone, and p value of 0.05 shows trend towards significance.

However, the basic limitation of this study is that this early stage carcinoma tongue group of patients does not represent the entire early stage carcinoma tongue patients being treated at our institute. There are some patients with stage T1 N0M0 who underwent surgery for local primary with or without neck dissection under otolaryngology department, and the histopathology being favorable, were kept on follow up, and hence were not accessible for the present study. Therefore, without analyzing that subgroup of early stage carcinoma tongue patients, it is difficult to inculcate these conclusions into clinical practice.

Also, by analyzing all above stage I post-operative patients (who were kept on follow up in view of favorable histology, and were not accessible for the present study), it would have been possible to compare the outcomes of neck irradiation alone to neck dissection alone. Therefore, a large well-randomized study is needed before clinically applying the results on the patient population.

5. Conclusion

To conclude, in early stage patients of carcinoma tongue, along with the management of local primary site, the neck should also be addressed, as the outcomes are significantly improved after primary surgical resection with concomitant neck dissection.[3,4,6] And based on our study, we conclude that elective neck irradiation can be considered as an alternative to neck dissection plus radiation to treat occult lymph node metastasis in stage I carcinoma oral tongue, but the same does not hold true for stage II patients in which neck dissection is mandatory.

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Conflict of interest

The authors declare no conflicts of interest in the preparation of the manuscript or during the study. No financial grants were obtained during the study period.

References

1. Regezi JA, Sciubba JJ, Jordan RCK. Oral pathology: clinical, pathologic correlations. Edited by: St Louis (MO). Saunders Elsevier; 5. 2008:12-24.
2. Byers RM, El - Naggar AK, Lee YY, *et al*. Can we detect or predict the presence of occult nodal metastases in patients with squamous carcinoma of the oral tongue? Head Neck. 1998;20:138-44.
3. Huang SF, Kang CJ, Lin CY, *et al*. Neck treatment of patients with early stage oral tongue cancer: comparison between observation, supraomohyoid dissection, and extended dissection. Cancer. 2008;112:1066-75.
4. D'Cruz AK, Siddachari RC, Walvekar RR, *et al.* Elective neck dissection for the management of the N0 neck in early cancer of the oral tongue: need for a randomized controlled trial. Head Neck. 2009;31:618-24.
5. Spiro RH, Strong EW. Surgical treatment of cancer of the tongue. Surg Clin North Am. 1974;54:759-65.
6. Franceschi D, Gupta R, Spiro RH, *et al*. Improved survival in the treatment of squamous carcinoma of the oral tongue. Am J Surg. 1993;166:360-5.
7. Vainshtein JM, Griffith KA, Feng FY, *et al.* Patient-reported voice and speech outcomes after whole-neck intensity modulated radiation therapy and chemotherapy for oropharyngeal cancer: prospective longitudinal study. Int J Radiat Oncol Biol Phys. 2014;89:973-80.
8. Kokemueller H, Rana M, Rublack J, *et al*. The Hannover experience: Surgical treatment of tongue cancer-A clinical retrospective evaluation over a 30 years period. Head Neck Oncol. 2011;3:1.
9. Almangush A, Bello IO, Coletta RD, *et al*. For early-stage oral tongue cancer, depth of invasion and worst pattern of invasion are the strongest pathological predictors for locoregional recurrence and mortality. Virchows Archiv. 2015;467:39-46.
10. Bur AM, Lin A, Weinstein GS. Adjuvant radiotherapy for early head and neck squamous cell carcinoma with perineural invasion: A systematic review. Head & neck. 2016;38:2350-7.
11. El-Husseiny G, Kandil A, Jamshed A, *et al.* Squamous cell carcinoma of the oral tongue: an analysis of prognostic factors. Br J Oral Maxillofac Surg. 2000;38(3):193-9.
12. Hosal AS, Unal OF, Ayhan A. Possible prognostic value of histopathologic parameters in patients with carcinoma of the oral tongue. Eur Arch Otorhinolaryngol. 1998;225:216-19.
13. Kantola S, Parikka M, Jokinen K, *et al*. Prognostic factors in tongue cancer: Relative importance of demographic clinical and histopathological factors. Br J Cancer. 2000;83:614-19.
14. Ünal OF, Ayhan A, Hosal AS. Prognostic value of p53 expression and histopathological parameters in squamous cell carcinoma of oral tongue. J Laryngol Otol. 1999;113:446-50.
15. Wang YH, Chen YF, Guo ZM, *et al*. Reasons for recurrence and prognostic analysis of early stage squamous cell carcinoma of the oral tongue. Chin J Cancer. 2009;28:1-5.
16. Zwetyenga N, Majoufre-Lefebvre C, Siberchicot F, *et al*. Squamous cell carcinoma of the tongue: treatment results and prognosis. Rev Stomatol Chir Maxillofac. 2003;104:10-7.
17. Gorsky M, Epstein JB, Oakley C, *et al*. Carcinoma of the tongue: A case series analysis of clinical presentation, risk factors, staging, and outcome. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2004;98:546-52.
18. Ganly I, Patel S, Shah J. Early stage squamous cell cancer of the oral tongue-clinicopathologic features affecting outcome. Cancer. 2012;118:101-11.
19. Weiss MH, Harrison LB, Isaacs RS. Use of decision analysis in planning a management strategy for the stage N0 neck. Arch Otolaryngol Head Neck Surg. 1994;120:699–702
20. Haddadin KJ, Soutar DS, Oliver RJ, *et al*. Improved survival for patients with clinically T1 T2 N0 tongue tumors undergoing prophylactic neck dissection. Head Neck. 1999;21:517-25.
21. Mashberg, Meyers H. Anatomical site and size of 222 early asymptomatic oral squamous cell carcinomas: A continuing prospective study of oral cancer, II. Cancer. 1976;37:2149-57.
22. Shah JP. Head and Neck Surgery and Oncology. 4th ed. Edinburgh: Mosby; 2003.
23. Fakih AR, Rao RS, Patel AR. Prophylactic neck dissection in squamous cell carcinoma of oral tongue: a prospective randomized study. Semin Surg Oncol. 1989;5:327-30.
24. Yuen AP, Ho CM, Chow TL, *et al*. Prospective randomized study of selective neck dissection versus observation for N0 neck of early tongue carcinoma. Head Neck. 2009;31:765-72.
25. Gokavarapu S, Parvataneni N, Reddy R, *et al.* Role of postoperative radiation therapy (PORT) in pT1-T2 N0 deep tongue cancers. Oral Surg Oral Med Oral Pathol Oral Radiol. 2015;120:227-31.