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Original Research Article

Early carcinoma tongue: evaluation using ultrasonography and its comparison with final histopathological findings

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ABSTRACT

Background: Squamous cell carcinoma of the tongue is a common malignancy associated with risk factors like excessive alcohol consumption, heavy tobacco smoking and human papilloma virus. Magnetic resonance imaging (MRI) scan is considered to be the gold standard in investigating these tumors. However, MRI equipment is expensive to buy and is not readily available in some centers. Computed tomography scan has also been used in imaging these patients, but this modality carries a radiation burden. Patient's five-year survival is dependent on early diagnosis. It is, therefore, important to diagnose early and image accurately to ensure good outcomes. This study was focused on evaluating the role of Ultrasonography in assessing early tongue cancer and its comparison with postoperative histopathological findings. The objectives of this study are to evaluate the role of sonography in assessing early tongue cancer depth of invasion and compared it with postoperative histopathological findings.
Methods: A prospective study was performed on 100 cases of early tongue cancer. sonography of the tongue was performed, BY 7.5 MHz - 12 MHz Probe. Ultrasonography findings compared with post-operative histopathological findings sensitivity and specificity calculated.
Results: All patients underwent sonography of tongue with 7.5 MHz probe to know the depth of tumor and these findings were compared with depth demonstrated on final histopathological reports. Sensitivity and specificity of USG for depth of tumor were very high (HPR findings were taken as standard results). On USG, tumor thickness i.e. 2 mm, 2-4 mm and >4 mm were observed in 22, 55 and 23 patients. On HPR, tumor thickness i.e. 2 mm, 2-4 mm and >4 mm were observed in 20, 60 and 20 patients. Sensitivity and septicity both above 90%.
Conclusions: Ultrasonography proved a reliable diagnostic tool with sensitivity and specificity more than 90%, for knowing the pre-operative depth of tumor but further larger randomized studies required to confirm the recommendations.

Keywords: Sonography, Tongue cancer

INTRODUCTION

Magnetic resonance imaging (MRI) is the preferred modality for evaluation of tongue cancer.[1] Abnormalities detected on MRI are well correlated pathologically.[2] Magnetic resonance imaging provides in-depth knowledge of tumor extension both inside and outside the tongue.

However, it is generally expensive and sometimes unavailable. In addition, claustrophobia, incompatibility with metallic implants, and the length of the procedure are additional considerations. Although the risk of

contrast agent reactions in MRI is less than that in computed tomography, they are known to occur.[3] Magnetic resonance imaging contrast agents are to be avoided in patients with renal insufficiency.[4,5] Sonography is a powerful investigative tool in head and neck disorders because of its high resolution, convenience, and adaptability.[6] It is safe, inexpensive, and easily available and can be performed for follow-up repeatedly as well as at the bedside. Sonography can also be per- formed in patients who are claustrophobic, patients with contrast agent hypersensitivity, patients with renal insufficiency, and patients with metallic implants· A prospective study was performed on 100 cases of early tongue cancer. sonography of the tongue was performed, BY 7.5 MHz - 12 MHz Probe preoperatively Ultrasonography findings compared with post-operative histopathological findings sensitivity and specificity calculated.

METHODS

After institutional Ethical Committee approval and written informed consent from each patient were obtained. The present prospective study comprised of 100 patients who attended the surgery department at D Y Patil medical college between October 2016 to August 2017, with diagnosis of early oral carcinoma tongue (cT1/T2/N0). After relevant clinical history and examination, punch biopsy was taken from the tongue lesion. Proven cases of squamous cell carcinoma were included in the study.

Inclusion criteria

- Early tongue carcinoma (T1/T2)
- Clinically negative neck (cN0)
- Biopsy proven cases (SCC)

Exclusion criteria

- Advanced tongue carcinoma (T3/T4)
- Clinically positive neck (cN+)
- Previously operated cases
- Post chemotherapy/radiotherapy cases
- Biopsy negative for malignancy
- Lesion involving base of tongue

Sonography tongue using 7.5 - 12 MHz probe done in all cases to know the depth of lesion. All patients underwent wide local excision of tongue + MND type II (Modified Radical Neck Dissection Type II). Final histopathological findings i.e. pT, pN, differentiation and depth of invasion were compared with pre-op clinical and radiological findings. Relevant statistical methods were used to make the results.

RESULTS

Relavant statistical methods were used to make the results. Various observations were made as following:

Table 1: Distribution of cases of carcinoma tongue according to age and sex.

Age group(yrs)	Male (n=62)	Female (n=38)	Total (n=100)
31-40	6	4	10
41-50	10	6	16
51-60	24	17	41
61-70	13	6	19
>70	9	5	14

Present study was male predominant study, having a total of 62 males out of total 100 patients. Majority of patients belonged to 5thand 6th decade i.e., 57 in both sex. Mean age was 59.12 years. Age of youngest patient was 30 years while that of oldest patient was 79 years.

Table 2: Comparison of depth of tumor estimated by Ultrasonography and histopathology.

Depth (in mm)	Sonography	Histopathology
2	22	20
2-4	55	60
>4	23	20

All patients underwent sonography of tongue with 7.5 MHz - 12 MHz probe to know the depth of tumor and these findings were compared with depth demonstrated on final histopathological reports.

Table 3: Sensitivity and specificity of USG for depth of tumor up to 2mm depth.

	Histopathology	Ultrasonography
Positive	20	22
Negative	80	78

Sensitivity = 20 (TP) / 20(TP) + 0(FN) = 100%; Specificity = 80 (TN) / 80(TN) + 2 (FP) = 97.6%

The next parameter evaluated was the sensitivity and specificity of USG in determining the depth of tumor taking final histopathological reporting as the standard. The evaluation was done demonstrating sensitivity and specificity of USG in determine depth of tumor up to 2mm, 2-4 mm and more than 5mm depth, results of which are described below:

Table 4: Sensitivity and specificity of USG for depth of tumor 2 mm to 4 mm depth.

	HPR	USG
Positive	20	23
Negative	80	77

Sensitivity = 60 (TP) / 60(TP)+5(FN) = 92.30%; Specificity = 40 (TN) / 40(TN) + 0 (FP) =100%

Sensitivity and specificity of USG for depth of tumor were very high (HPR findings were taken as standard results) as shown in Table 5.

Table 5: Sensitivity and specificity of USG for depth of tumor greater 4 mm depth.

	HPR	USG
Positive	20	23
Negative	80	77

Sensitivity = 20 (TP) / 60(TP) + 0(FN) = 92.30%; Specificity = 80 (TN) / 80(TN) + 3 (FP) = 96.38%

Thus, the authors have found that sensitivity and specificity of USG is significant in determining the depth of tumor thus making it an effective investigation in the evaluation of Carcinoma tongue.

DISCUSSION

The present prospective study was conducted to evaluate a high-resolution ultrasound system for intraoral measurement of tumor thickness and to compare the measured maximum at baseline tumor thicknesses. Observations were made. At the end of study, relevant statistical tests were performed, and results were analysed.

Table 6: Showing gender wise distribution of cases of carcinoma tongue.

Study	Total no. of patients	Male:female
Kumar et al[7]	60	44: 16
Nithya et al[8]	75	45:30
Present study	100	62:38

The mean age in the present study was 59.12 years. Similar studies conducted by Nithya et al, Helsinki, Tampere and Kuopio with mean age of 52.6 years, 59.5 years, 65 years and 64 years, respectively. So, the mean age of the above studies is as per with the mean age of present study. In the present study there were 100 cases in all, out of which 62 were males and 38 were females. All the above studies reported predominance of carcinoma tongue in males which is consistent with the present study.

The need for elective neck dissection in patients with early stage oral cancer is controversial. A preoperative predictor of the risk of subclinical nodal metastasis would be useful. Studies have shown a strong correlation between histological tumor depth and the risk of nodal metastasis.[9,10] To determine if preoperative ultrasonography is an accurate measure of tumor depth in oral carcinoma. To assess if preoperatively measured tumor depth predicts an increased risk of subclinical metastatic neck disease and thus the need for elective neck dissection.[11] The present prospective study was conducted to evaluate a high-resolution ultrasound system for intraoral measurement of tumor thickness and to compare the measured maximum at baseline tumor thicknesses. Observations were made. At the end of study, relevant statistical tests were performed, and results were analysed. Taylor M conducted a study to know if preoperative ultrasonography accurate in measuring tumor thickness and predicting the incidence of cervical metastasis in oral cancer and found that the rate of metastasis was 33% in N0 necks.

In the group with tumors <5mm in depth, the neck metastatic rate was 0%, as compared with 65% in the group 5mm. Using univariate analysis tumor depth and T stage were significant predictors of cervical metastasis (P=0.0351 and P=0.0300, respectively).[12]

Similar studies done by Scheer M and found that the average of the measured tumor thickness was 14±7 mm. Tumor thickness was in the N + group with 15±7 mm (p is greater than in the N = 0.032 t-test) 0 group with 12±6 mm. In the group of T1 / T2 tumors, the mean tumor thickness was 10±5 mm as opposed to 16±6.6 mm in the T3 / T4 tumors.[13]

In the present study, ultrasonography proved a reliable diagnostic tool with sensitivity and specificity more than 90%, for knowing the pre-operative depth of tumor. So, the present study and above said studies are with the fact that preoperative ultrasonography is an accurate measure of tumor depth in tongue carcinoma.

CONCLUSION

Ultrasonography proved a reliable diagnostic tool with sensitivity and specificity more than 90%, for knowing the pre-operative depth of tumor...But further larger randomized studies required to confirm the recommendations.

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