

## A comparative analysis of anterior versus posterior squamous cell carcinoma of the tongue: a 10-year review

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### Abstract

**Introduction:** The study sought to compare and contrast squamous cell carcinoma (SCC) of the anterior mobile tongue with SCC of the tongue base, with emphasis on clinical presentation, management and outcome.

**Methods:** This was a retrospective, comparative analysis of patients treated for SCC of the tongue over a 10-year period. Cox's regression model was used to assess the effect of tumour site on survival.

**Results:** The study included 142 patients, of whom 86 were treated for SCC of the anterior tongue and 56 for tongue base lesions. Patients with carcinoma of the anterior tongue tended to present with a visible lump or ulceration of the tongue, whereas the majority of patients with tongue base SCC presented with pain. Sixty per cent of anterior tongue lesions were early stage (I or II) at initial presentation as compared with 21 per cent of tongue base lesions.

**Conclusion:** Patients with anterior tongue lesions had a better prognosis, but this was not statistically significant when adjusted for stage.

**Key words:** Tongue; Carcinoma; Comparative Study; Prognosis; Staging

### Introduction

The anterior two-thirds of the tongue and the posterior third are generally considered as two separate anatomical entities. The anterior, mobile tongue extends from the tongue tip to the circumvallate papillae of the tongue and is part of the oral cavity, whereas the posterior one-third of the tongue is considered to be part of the oropharynx. Patients with squamous cell carcinoma (SCC) of the tongue base are often perceived to have a less optimistic prognosis than those with SCC of the anterior, mobile tongue. The aim of this study was to compare the clinical presentation of tumours at these sites and to examine the independent effect of tumour site on survival outcome, with current treatment modalities.

### Materials and methods

We reviewed the medical records of all patients treated at the Mater Misericordiae Hospital with biopsy-proven SCC of the tongue between 1991 and 2000. Patients were excluded from the study if deemed appropriate for palliative treatment at initial assessment or if the histological lesion was a malignancy other than invasive SCC. In addition, five patients were excluded due to insufficient medical records (i.e. no hospital or general practitioner record of

cause and date of death). Thus, 142 of the 167 patients treated for tongue malignancies in the designated 10-year period were eligible for inclusion in the study. Data obtained included sex, age, presenting complaint, risk factors, stage at presentation, treatment modality and outcome. Tumour staging was carried out using the tumour-node-metastasis (TNM) classification, as set by the American Joint Committee for Cancer Staging and End Result Reporting. Patients were followed up for a minimum period of three years or until death. Data were analysed using Stata Release 8.2 software, and Cox regression analysis was used to examine tumour site as a prognostic factor, with adjustment for stage as a categorical variable.

### Results

#### *Demographics*

One hundred and forty-two patients were included in the study. Eighty-six patients were treated for SCC of the anterior tongue and 56 for tongue base lesions.

Patients' ages ranged from 23 to 87 years, with a mean age of 60 years. Age was examined as a prognostic factor for survival. There seemed to be a slight advantage to being over 60 years, but this was not statistically significant.

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There was a male predominance of 2.7:1. Similar age patterns and sex distribution were seen for both patient groups.

A high proportion of patients in both groups gave a history of regular tobacco and/or alcohol use (see Figure 1).

*Clinical presentation*

Sixty per cent of patients with SCC of the anterior tongue presented with either ulceration or a lump in the tongue, compared with only 8 per cent of those with posterior tongue lesions. Only 23 per cent of patients with anterior tongue lesions complained initially of pain and none presented with a neck mass as the presenting complaint. In contrast, 76 per cent of patients with tongue base SCC presented with pain, either in the tongue, throat or mandible, and 16 per cent presented with a neck lump.

Sixty per cent of anterior tongue lesions were at an early stage (I or II) at initial presentation, as compared with 21 per cent of tongue base lesions (Figure 2).

*Treatment modality*

Treatment was chosen on an individual basis, taking into account tumour stage, accessibility, and patient factors such as age, co-morbidity and patient preference. Three modes of primary treatment were employed: (1) surgical removal of the primary lesion, with or without neck dissection; (2) radiation therapy to the primary lesion, with or without external beam radiation to the neck; and (3) combined surgery and radiotherapy.

For anterior tongue lesions, all early stage tumours were treated surgically as first-line treatment, mainly by cold knife resection or laser removal. In those cases in which the primary ulcer measured more than 5 mm in depth, a selective neck dissection was also done. Advanced lesions were treated mainly by a combination of surgery and radiation therapy.

Tongue base stage I lesions were treated mainly by local resection. Four patients with stage II disease were treated surgically and four patients had first-line

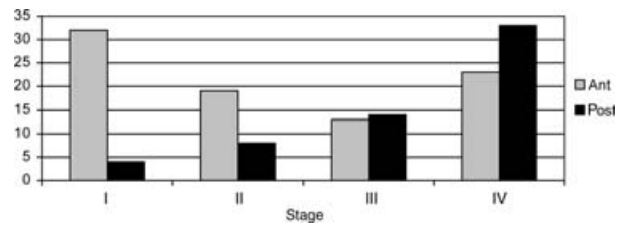


FIG. 2

Tongue squamous cell carcinoma stage at presentation.

radiotherapy. A majority of patients with stage III or IV disease were treated initially with radiation therapy (Table I).

Patients receiving radiotherapy post-operatively were mainly treated with cobalt linear acceleration of 60 Gy in 30 fractions. Patients with positive tumour margins on pathological examination were treated with 64 Gy in 32 fractions. For patients who did not undergo surgical treatment, a dose of 64–68 Gy was used in 32 to 34 fractions. A further 44–46 Gy was directed at the neck open field.

*Outcome*

Survival rates were calculated by the Kaplan–Meier method. There was a 64.9 per cent (95 per cent confidence interval (CI) 53.8–74) overall three-year survival for patients with anterior tongue lesions and a 37.9 per cent (95 per cent CI 24.9–50.8) overall three-year survival rate for those with tongue base lesions. For patients with anterior tongue lesions, three-year survival rates ranged from 85.7 per cent (95 per cent CI 66.3–94.4) for stage I tumours to 37.5 per cent (95 per cent CI 19.0–56.0) for stage IV tumours. For patients with tongue base lesions, three-year survival rates ranged from 75.0 per cent (95 per cent CI 2.8–96.1) for stage I tumours to 32.3 per cent (95 per cent CI 16.4–49.3) for stage IV tumours.

Anterior tongue lesions were associated with a better prognosis (see Figure 3), but adjustment for stage reduced the prognostic effect of site significantly, to the point where site was no longer a statistically significant predictor of prognosis (hazard ratio 0.78, 95 per cent CI 0.48–1.2) (Figure 4).

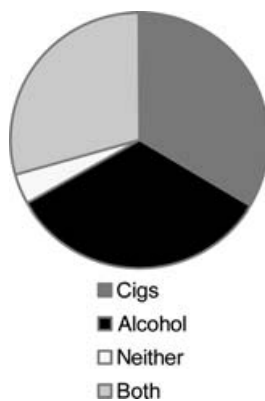


FIG. 1

Risk factors for tongue squamous cell carcinoma. Cigs = cigarettes

TABLE I  
INITIAL MODE OF TREATMENT

Initial treatment	Stage			
	I	II	III	IV
<i>Anterior tongue</i>				
Surgery only	26	18	7	9
RT only			1	2
RT & surgery	2	4	4	13
<i>Tongue base</i>				
Surgery only	3	4	1	3
RT only	1	4	11	18
RT & surgery			1	10

RT = radiotherapy

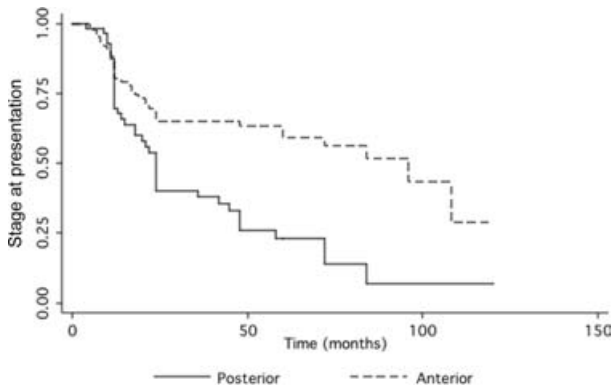


FIG. 3

Survival by site for anterior and posterior squamous cell carcinoma of the tongue.

**Discussion**

In this study, patients with anterior tongue lesions appeared to have a better outcome, but, when the results were analysed and compared stage-for-stage, there was no statistically significant difference in disease-specific survival. The better prognosis associated with anterior tongue lesions was due to patients with these tumours presenting at an earlier stage. Spiro and Strong (1974) were the first to challenge the perceived poorer prognosis associated with tongue base lesions.<sup>1</sup> In a review of 450 patients treated for tongue cancer, they found that outcome results for patients who underwent surgical treatment were no different according to clinical stage for anterior and posterior tongue lesions. Two other studies, Ildstad *et al.* (1983) and Nason *et al.* (1996) have also compared anterior and posterior tongue SCC outcome.<sup>2,3</sup> These two studies included both patients treated surgically and those treated with radiation therapy and reported no statistical difference in outcome based on tumour site. In our study, as with these earlier reports, patients with tongue base lesions were more likely to present with advanced stage disease. Seventy-nine per cent of patients with tongue base lesions presented with

late stage (III or IV) disease at initial presentation, compared with only 40 per cent of patients with anterior tongue lesions.

Clinical presentation also differed between the two groups. Patients with carcinoma of the anterior tongue tended to present with a visible lump or ulceration of the tongue, whereas the majority of patients with tongue base tumours presented with vague pain (either a sore tongue or throat, mandibular ache, or otalgia). Tongue base neoplasms are often asymptomatic in the early stages due to the relatively poor innervation of the tongue base<sup>4</sup> and the hidden location of the tumour. By the time the patient senses pain, the tumours tend to be at an advanced stage. In this study, only 7 per cent of patients had tongue base tumours less than 2 cm in diameter, as compared with 34 per cent of patients with anterior tongue lesions. This highlights the importance of always palpating the tongue base when examining the oral cavity or performing a panendoscopy, especially in high risk groups.

Early stage neoplastic lesions of the mobile tongue are generally treated by surgical excision. Localized lesions are usually removed with a surrounding cuff of normal tissue, as higher recurrence rates have been reported for tumours with positive margins even if adjunctive radiotherapy is given.<sup>5,6</sup> At our hospital, patients undergo neck dissection if the primary tumour is more than 5 mm in depth, as reports have shown an increased risk of cervical nodal metastases in these cases.<sup>7,8</sup> More advanced lesions of the mobile tongue are usually treated by combined surgical and radiation treatment.

The management of patients with carcinoma of the posterior third of the tongue varies considerably amongst institutions. Loco-regional control is equivalent for T1 to T2 tumours, surgically or by radiation.<sup>9</sup> Surgical treatment of the tongue base often requires extensive resection, with resultant loss of function, and hence is frequently reserved for smaller, peripheral lesions.<sup>10</sup> Radiation is often the preferred first-line treatment option. Many institutions report data that support the use of external beam radiation as the primary treatment for tongue base lesions, with neck dissection for patients with nodal disease.<sup>11-13</sup> Advanced lesions are either treated by radiation or by radical surgery followed by post-operative radiotherapy. The role of interstitial radiation is controversial, as although improved results are reported in some studies,<sup>10,12,13</sup> implantation may be technically difficult, result in major haemorrhage and increase the risk of soft tissue necrosis.<sup>14-16</sup> Only one patient in our series was treated with brachytherapy, in which there was tumour extension after full dose external beam radiation.

Regardless of the treatment modality, the prognosis remains poor for patients with advanced stage lesions anywhere in the tongue, especially when there is metastasis to the cervical lymph nodes. In contrast, patients with early stage disease of either the anterior tongue or the tongue base can expect good results with optimal treatment, and the site of

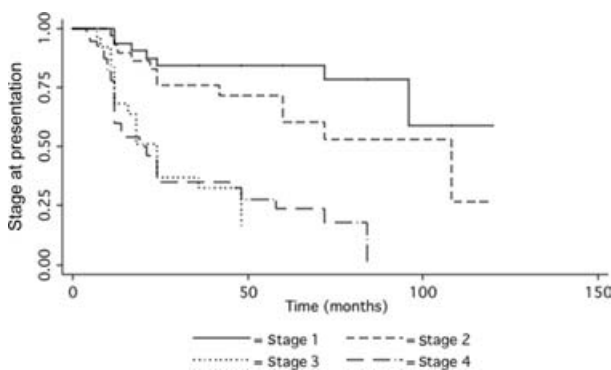


FIG. 4

Combined survival by stage for both anterior and posterior tongue squamous cell carcinoma.

the tongue lesion should not adversely affect survival expectation.

### Conclusion

When compared stage-for-stage, there was no statistically significant difference in survival between patients treated for anterior tongue SCC and those treated for tongue base SCC. The decreased overall survival seen in patients with SCC of the tongue base is often due to advanced stage of disease at presentation.

- **This retrospective, comparative analysis compared and contrasted squamous cell carcinoma (SCC) of the anterior tongue with that of the tongue base, with emphasis on clinical presentation, management and outcome**
- **Patients with SCC of the anterior tongue tended to present with a visible lump or ulceration of the tongue, whereas the majority of patients with tongue base SCC presented with pain. Patients with anterior tongue lesions presented at an earlier stage than those with tongue base lesions**
- **When adjusted for stage, there was no statistically significant difference in survival between patients with SCC of the anterior tongue and those with SCC of the tongue base**

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