



AJCC 8th Edition oral cavity squamous cell carcinoma staging – Is it an improvement on the AJCC 7th Edition?



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ABSTRACT

Objectives: To explore the prognostic and discriminatory ability of the AJCC 8th Edition Oral Cavity cancer staging in a non-North American population, and compare it to the previously used AJCC 7th Edition.

Materials and methods: Retrospective chart review was performed at a tertiary referral Otolaryngology, Head Neck and Skull Base Department in Australia, from June 2002 to June 2017. Oral cavity squamous cell carcinoma cases were staged according to AJCC 8th Edition, which was compared to AJCC 7th Edition staging, for disease-free survival (DFS) and overall survival (OS). DFS and OS were analysed using Kaplan-Meier curves.

Results: There were 118 patients treated for OSCC, with an average age of 61 years, 63% were male. Overall survival grouped by stage demonstrated statistically significant discrimination between cancer stages using both the AJCC 7th and AJCC 8th Editions. AJCC 7th Edition did not discriminate between stages for DFS. Conversely, AJCC 8th Edition did statistically significantly discriminate for DFS ($p = 0.0002$). The DFS for both Stage 4a and 4b was significantly worse than cases in Stage 1. AJCC 8th Edition T stage was statistically significantly related to DFS ($p = 0.0199$), while the AJCC 7th Edition T stage was not.

Conclusion: The AJCC Cancer Staging Manual 8th Edition includes both the depth of primary tumour invasion and extracapsular extension of lymph node metastases. The AJCC 8th Edition OSCC staging system showed improved disease-free survival discrimination between overall stages and between T categories, while AJCC 7th Edition did not.

Introduction

The 8th Edition of the American Joint Committee on Cancer (AJCC) Staging Manual, Head and Neck Section has recently been released and will have been introduced into clinical practice at the commencement of 2018 [1]. The 8th Edition represents the most significant changes to Oral Cavity cancer staging since the first edition of the American Joint Committee on Cancer Staging Manual was published in 1977 [2].

Major changes to the Oral Cavity cancer staging include changes to the T and N staging categories, while the overall staging remains unchanged. Staging changes reflect widely accepted poor prognostic elements of oral cavity squamous cell carcinoma (OSCC). The T stage category has been changed to incorporate the depth of invasion of the tumour, within stages 1, 2 and 3. T4a no longer incorporates extrinsic muscle involvement, which is considered in depth of invasion in T

stages 1–3.

From as early as 1986, tumour thickness, as defined by Moore et al. [3], was reported to be associated with worse survival in patients with OSCC [4,5]. It has also been identified as a predictor of occult neck nodal metastases [6,7]. In patients with T1 and T2 tumours more than or equal to 4 mm thick [8], and T1 tumours more than or equal to 5 mm thick [9], elective neck dissection has been associated with a reduction in locoregional failure. Ganly et al. similarly demonstrated tumour thickness to be associated with an increase in neck recurrence in early OSCC (T1-2, N0) following neck dissection [10]. Moore defined tumour thickness as the distance from the normal mucosa to the deepest part of tumour invasion [3], whereas the modern concept of tumour depth of invasion (DOI) is defined as the distance from the adjacent basement membrane to the deepest part of the primary tumour [4]. Recent data suggests DOI is a better predictor of prognosis than tumour thickness

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[11]. Multiple authors have proposed addition of depth on invasion to the T category [12–15], with a large multicenter study demonstrating improved discrimination between subgroups with addition of DOI to the T category [14]. The aim of the addition of depth of invasion is to separate superficial tumours with a good prognosis from small tumours that are deeply invasive and associated with poor prognosis.

A retrospective study has demonstrated that extranodal tumour extension more than 1.7 mm beyond the nodal capsule is negatively associated with disease-specific survival in patients with OSCC [16].

The new T and N stages were validated using North American datasets [17]. To the authors' knowledge, the AJCC 8th Edition Oral Cavity cancer staging has not been validated in a population outside of North America.

Given the known geographic and ethnic differences in etiology and outcomes of OSCC [18,19], the aim of this retrospective case series was to explore the prognostic and discriminatory ability of the AJCC 8th Edition Oral Cavity staging in a retrospective non-North American population, and compare it to the previously used AJCC 6th and 7th Editions (referred to as AJCC 7th stage, as there were no differences in the staging of oral cavity cancer between the two editions). The difference in overall and disease-free survival between staged groups is reported.

Materials and methods

This is a retrospective chart review performed at a tertiary referral Otolaryngology, Head Neck and Skull Base Department in Western Australia, from June 2002 to June 2017. The Pathology Department database was interrogated to identify specimens of oral cavity (ICD-10 C02-006) squamous cell carcinoma within the study period. Approval to undertake the study was obtained from the Sir Charles Gairdner Hospital Human Research Ethics Committee, reference number 21867.

Cases eligible for inclusion were those patients of any T and any N stage, without distant metastases (M0) treated surgically with curative intent, for a first presentation of oral squamous cell carcinoma. All cases that matched these inclusion criteria were included, irrespective of whether they received post-operative radiotherapy and/or chemotherapy. Retrospective chart review of patients' pathological data identified cases suitable for inclusion. Cases for whom assigning a T stage or assigning an overall stage was not possible based on the original histopathologic reports were excluded from analyses of these factors, as described below.

Demographic, clinical, treatment and follow-up data was extracted from patient charts. The Western Australian Cancer Registry was used to obtain recurrence and mortality data. A de-identified, confidential and password secured database of the extracted information, from diagnosis to five years post diagnosis was created.

Cases were staged retrospectively according to the AJCC 8th Edition Cancer Staging Manual. Cases were assigned a T stage when there was sufficient information on the historical histopathology report to confidently ascertain depth of invasion based on the method used in the AJCC 8th edition [17] (for T1-T3) or bony involvement (T4). Lydiatt et al. describe 'depth of invasion' as measured from the plane of the level of the basement membrane of adjacent normal mucosa to the plane of the level of the deepest point of tumour invasion. This is the definition used in the AJCC 8th Edition and in this analysis. Cases were assigned an N stage when the presence or absence of extranodal extension was described in the historical histopathology report. In some cases, there was inadequate depth of invasion information to assign a T stage, but adequate information to determine the cases were not T4. In these circumstances, these cases were assigned a T1-3 and this was used for overall staging.

There are no differences in the staging of oral cavity cancer between AJCC 6th and 7th editions, so they will be herein referred to as 'AJCC 7th Edition'. AJCC 6th and 7th Edition stages that were assigned at the hospital's Head and Neck Cancer Multidisciplinary Team (MDT)

Meeting by the clinicians at the time of cancer diagnosis, and treatment regimens were obtained from retrospective chart review, and no changes were made to these original stages. AJCC 8th Edition Stage was compared with the historical AJCC 7th Stage for each case. In accordance with the National Institute of Cancer definitions [20], overall survival (OS) was defined as the length of time from diagnosis to death, and disease-free survival (DFS) was defined as the length of time after the primary treatment of a disease was finished (in these cases surgical treatment) that the patient survived without signs or symptoms of disease recurrence. OS and DFS using the two staging systems were compared using Kaplan-Meier curves. P values are reported, where $P < 0.05$ was considered statistically significant.

Results

Staging

Of the 138 patients, retrospective AJCC 8th T staging was possible for 117 cases, and overall staging possible for 118 patients, using information derived from original case files and histopathological reports.

Of these, 67 cases were oral tongue (64 dorsal and lateral, 3 ventral), 32 were floor of mouth, nine were buccal mucosa, six were alveolus and gum (5 upper, 1 lower) and three were hard palate, see Table 1.

The average age of the 118 cases was 61 years (SD 15.32 years), and 63% of cases were male. The median duration of symptoms was 3 months. Demographic, clinical and treatment characteristics are reported in Table 2.

Comparing the AJCC 7th and 8th editions, oral cavity cancer stage changed in one third of cases, 32 cases were upstaged and 8 cases were down-staged by the AJCC 8th Edition staging system, see Table 3.

Cases with advanced disease were more likely to have a neck dissection and were more likely to receive adjuvant radiotherapy and adjuvant chemotherapy, see Table 2.

Overall survival

OS grouped by stage according to AJCC 7th and AJCC 8th editions both demonstrated statistically significant discrimination between cancer stages. AJCC 7th Edition stage groupings were overall statistically significant ($p = 0.0436$) where OS was better for Stage 1 compared to Stage 3 and Stage 4 separately. Staged grouping according to the AJCC 8th Edition also discriminated between the groups with statistical significance ($p = 0.0002$), with better OS for Stage 1 compared to Stage 4a and 4b separately (Fig. 1).

Table 1
Oral cavity cancers included by subsite.

ICD-10	Subsite	Number
	Buccal Mucosa	
C00.3, C00.4	Mucosa of upper and lower lips	0
C06.0	Cheek mucosa	1
C06.2	Retromolar areas	7
C06.1	Upper and lower vestibule of mouth	2
C03.0	Upper alveolus and gingiva	5
C03.14	Lower alveolus and gingiva	1
C05.0	Hard palate	3
	Oral tongue	
C02.0, C02.1	Lateral and dorsal	64
C02.2	Ventral	3
C04	Floor of mouth	32

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