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Accuracy of tongue oral cavity squamous cell carcinoma staging: Incisional biopsy before or after MRI?

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Abstract

Accurate staging of oral squamous cell carcinoma (OSCC) is essential. Some clinicians advocate delaying the diagnostic biopsy procedures until after the staging magnetic resonance imaging (MRI) scan is completed. A retrospective study of 58 tongue OSCCs treated at a single institute was undertaken using clinical records and the histopathology database. 39 OSCCs were biopsied before MRI and 19 after MRI. From the biopsy-first group, 20.5% were up-staged, 23% down-staged and 56.4% maintained T stage. From the MRI-first group, 10% were up-staged, 31.5% down-staged and 57.8% maintained T-stage postoperatively. The time between initial intervention and excision was significantly longer in the MRI-first group at 43 days, compared to the biopsy-first group at 15.9 days ($p < 0.001$). Whereas staging changes between the two groups were not statistically significant. Undertaking diagnostic biopsies before or after pre-treatment MRI appears not to affect accuracy of clinical staging. Delaying diagnostic biopsies may be unnecessary and delay treatment.

Introduction

The timing of diagnostic biopsies in patients with suspected OSCC remains a contentious issue. Some authors cite the importance of performing biopsies at the earliest opportunity to reduce diagnostic delay and improve prognosis.¹ Others advocate delaying until MRI of the primary site has been undertaken to avoid artefact.² We investigated if performing biopsies, before or after pre-treatment MRI affects accuracy of primary tumour staging, in addition to the impact on time from initial intervention to treatment.

Methods

All OSCCs treated by Sheffield Oral and Maxillofacial Surgery over a 5-year period that had a neck dissection (Jan 2008 – June 2015) were retrospectively analysed using information from clinical records and the histopathology database (n=149). 58 patients with tongue tumours were identified; all had MRI imaging before staging. Patients who had a biopsy before staging MRI, and those after staging MRI were separated into two groups. Dates of biopsy, staging MRI scan, and surgical excision for both groups were collected. The average time between initial intervention (MRI or biopsy) and surgical resection for both groups was compared, and statistically analysed using a paired T-test. Fisher's exact test was used to determine whether the changes in staging between the two groups were statistically significant.

Furthermore, the preoperative T-stage decided at the head and neck multi-disciplinary team meeting (MDT) and final post-operative T-stage agreed with histopathological results, was also examined. Up-staging or down-staging was determined by comparison of preoperative T-stage to final T-stage for each case.

Results

39 OSCCs were biopsied before staging MRI and 19 after staging MRI. Overall, 25.8% (15/58) were down-staged and 17.2% (10/58) up-staged. From the MRI-first group 10% were up-staged (2/19), 31.5% (6/19) down-staged and 57.8% (11/19) maintained T-stage. From the biopsy-first group 20.5% (8/39) were up-staged, 23% (9/39) down-staged and 56.4% (22/39) maintained T stage (figure 1). No statistical difference in tumour staging changes between the two groups was seen (Fisher's exact test, $p < 0.12$).

The average waiting time between MRI and surgery was 36.6 days (range 3-63). The time between initial intervention (biopsy or MRI) and excision was significantly longer in the MRI-first group at 43 days (range 10-61), compared to the biopsy-first group at 15.9 days (range 8-30) ($p < 0.001$) (figure 2).

Discussion

Some debate exists regarding the impact of accurate interpretation of MRI imaging following oral biopsy procedures. Studies involving prostate and oral cancer have demonstrated over-estimation of tumour thickness post-biopsy attributed to the impact of high signal intensity hemorrhage and oedema.^{3,4,5} Other studies however, have found no significant difference in analysis and staging attributable to the period between the diagnostic biopsy and staging MRI.⁶ Accurate OSCC staging is essential to provide patients and clinicians with information necessary to discuss and formulate critical treatment decisions.^{7,8} This small cohort of patients with tongue OSCC demonstrates that undertaking biopsies before the staging MRI does not appear to compromise the accuracy of pre-treatment staging.

Waiting for diagnostic biopsy can be a significant factor in delayed treatment for cancer patients.^{1,9} This is supported by our findings. The retrospective nature of this

study did not allow analysis of other logistical and preference factors affecting delay. However the impact of only scheduling biopsy procedures following scan completion (practice in this unit) is highly likely to have caused delay. Our study does not demonstrate benefit in delaying the diagnostic biopsy. However, this was a pilot study investigating a small cohort and further studies involving a large cohort and tumours from other sites are required to further corroborate these findings.

Conclusions

Discrepancy can manifest between preoperative and final staging for tongue OSCC. Undertaking diagnostic biopsies before or after pre-treatment MRI does not appear to affect the clinical staging accuracy. Our findings suggest that delaying diagnostic biopsies until after MRI may be unwarranted and may significantly delay definitive treatment.

Key Words

oral cancer, oral squamous cell carcinoma, tongue, biopsy, MRI, cancer staging.

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