Evaluation and Staging of Oral Cancer

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KEYWORDS

• Oral cancer • TNM classification • Tumor size • Lymph node metastases
• Squamous cell carcinoma • PET scan • MRI • CT scan

KEY POINTS

- In 1959, the American Joint Committee on Cancer and the International Union for Cancer Control, through a collaborative effort, developed cancer-specific staging systems.
- Since their inception more than 60 years ago, these worldwide cancer-specific staging benchmarks have been critically important in determining the extent of a cancer, guiding management, standardizing clinical trial participants, as well as in providing standardized systems in predicting prognosis.
- The tumor-node-metastasis (TNM) classification system has been outlined as having the following 6 objectives: (1) aid in treatment planning, (2) prognosis, (3) aid in the assessment of treatment results, (4) facilitate the exchange of information between institutions, (5) support cancer control activities, and (6) contribute to continuing investigation of human malignancies.

RATIONALE FOR CANCER STAGING

In 1959, the American Joint Committee on Cancer (AJCC) and the International Union for Cancer Control (UICC), through a collaborative effort, developed cancer-specific staging systems.[1] Since their inception more than 60 years ago, these worldwide cancer-specific staging benchmarks have been critically important in determining the extent of a cancer, guiding management, standardizing clinical trial participants and also in providing standardized systems in predicting prognosis.[1,2] The tumor-node-metastasis (TNM) classification system has been outlined as having the following 6 objectives: (1) aid in treatment planning, (2) prognosis, (3) aid in the assessment of treatment results, (4) facilitate the exchange of information between

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institutions, (5) support cancer control activities, and (6) contribute to continuing investigation of human malignancies.[2–4]

Since the inception of a standardized TNM cancer staging system more than 60 years ago, various modifications have been made; however, the central theme of the AJCC and UICC staging system has been consistent. T refers to the extent of disease based on the size of the primary tumor and its local invasiveness. N refers to the presence or absence, size, and extent of regional lymph nodes. M refers to the presence or absence of distant metastasis. Currently, the TNM staging system that is in use for oral cancer was published in 2010 in the 7th edition of the manual published by the AJCC. In 2017, the 8th edition of this manual was released and its implementation will begin in January of 2018.[5]

TUMOR-NODE-METASTASIS STAGING OF ORAL CANCER

The first step in the staging process is identifying the histologic type of the lesion of interest. Squamous cell carcinoma (SCC), which comprises 90% of malignant neoplasms of the oral cavity and malignant neoplasms of the minor salivary glands within the oral cavity, share the same TNM staging system, whereas malignant melanoma has its own TNM staging system. Sarcomas of the oral cavity share the same staging system as sarcomas of the appendicular skeleton.

The staging process of a cancer is dynamic and modifiable as clinical and pathologic information is gathered during the workup and treatment process. For example, a patient who is being staged before surgery or a patient whose treatment is nonsurgical will have his or her cancer staged by using the clinical TNM (cTNM) system.[5] However, a patient who is being treated surgically will have his or her cancer staged based on the final surgical pathologic data and will have a separate pathologic TNM (pTNM) staging. The most recent staging, whether clinical or pathologic, will supersede previous TNM classifications in determining treatment recommendations and disease prognosis. Furthermore, aside from the “c” and “p” prefixes, the following prefixes are commonly used in cancer staging: “r” for recurrent tumor and “y” after radiation therapy and/or chemotherapy have been rendered. Of note, “r” and “y” prefixes are placed before “c” and “p” prefixes.

Tumor Classification

The tumor classification of a malignant neoplasm of the oral cavity describes the size of the primary tumor and its local invasiveness or extent. Tx denotes a situation when the primary tumor cannot be assessed. Tis within the oral cavity denotes a histologic diagnosis of SCC in situ irrespective of the size of the lesion; this T classification is only applicable to SCC. Therefore, Tis is not used for minor salivary gland neoplasms, sarcomas, or mucosal melanoma. However, when a diagnosis of invasive SCC has been rendered, T1, T2, and T3 classifications describe the primary lesion in its greatest surface dimension (**Fig. 1**). In the 7th edition of the AJCC staging system, T1 was for a lesion less than or equal to 2 cm, T2 denoted a lesion that was greater than 2 and less than or equal to 4 cm, and T3 corresponded to a lesion greater than 4. The 8th edition of the AJCC staging system will no longer solely depend on the greatest dimension of the surface of the lesion with regard to T1, T2, and T3 lesions.[5] The 8th edition of the AJCC staging system will incorporate depth of invasion (DOI), which will be defined by the pathologist as a measurement from the basement membrane relative to an area of intact squamous mucosa, which will be denoted as the horizon.[5] The distance from the horizon to the area of greatest invasion will serve as the measurement of DOI.[5] DOI is distinct from tumor thickness. The thickness of the tumor