Diagnosis of Head and Neck Squamous Cell Carcinoma is a Multidisciplinary Concept

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Introduction

The current comprehensive and multidisciplinary decision making of the management of Head and Neck Squamous Cell Carcinoma (HNSCC) considers all factors related to the patient, tumor, and available treatment modalities. This presentation highlights various tumor-related elements of the diagnostic process that need to be considered when establishing the diagnosis of HNSCC.

The diagnostic path is based on a thorough clinical head and neck examination. Adequate imaging studies involve either CT or MR for locoregional spread and chest CT or PET-CT for distant disease. Stage of disease remains the major determinant for HNSCC prognosis. This is followed by either cytological and/or histological sampling and analysis (including sentinel node biopsy). Development of techniques for analysis of blood, saliva and exhaled breath samples to aid in biomarker research is ongoing.

Histopathologic classification

Histopathologic features and classification of HNSCC are determined using hematoxylin and eosin (HE) staining and this mainly considers the degree of differentiation. Although this classification is classically reported by pathology reports, it has limited value in treatment planning of certain HNSCC cases. Therefore, recent studies have attempted to revise this system by, for example, incorporating tumor budding or lymphocytic infiltrate as part of histologic classification. Such recent modifications have shown superior prognostic value compared with the conventional WHO grading scheme and therefore, remain necessary to be considered in further validation studies. In addition to histologic grading, there are other histopathologic parameters (e.g. pattern of invasive front, perineural invasion and lymphovascular invasion) that are widely evaluated in HNSCC using HE staining and can aid in understanding the behavior of each individual HNSCC. Immunohistochemistry is generally available, but it is not highly standardized and typically offers only qualitative information. Currently, digital methods to improve analysis and diagnostic data are under development. A novel method has been developed to present tumor histopathology in 3D form allowing better visual understanding of margins, topography, and orientation.

Immunomarkers and molecular characteristics of HNSCC

During the last decade, several molecules have been studied for their significance in initiation and/or progression of HNSCC. However, few molecules can be considered as clinically relevant due to their role in categorization of HNSCC in general or in certain specific subtypes. In oropharyngeal subsite, as an example, p16 (INK4A) is widely reported as a surrogate tool to identify HPV and therefore, to classify oropharyngeal SCC as either associated with the viral infection (i.e. HPV positive that usually has good prognosis) or not associated (i.e. HPV negative that has poor survival).

HNSCC is characterized by frequent mutations and chromosomal alterations. The study of genetic data has identified a subgroup of genetically distinct HPV-negative HNSCC tumours with favourable prognosis. Tumours can be further subclassified based on genomic profiling. Some HNSCCs harbour genetic alterations, that create neoantigens, and thus immunotherapies may be effective for a subset of patients. Other than that, the issue of having information from sequencing studies to aid in targeted medical therapies remains rather contested.

Conclusions

Establishing a complete understanding of HNSCC is a multidisciplinary concept involving a collaborative effort and a clinical, radiological, and pathological evaluation of the tumor. All these components facilitate visual subjective measures that are limited by diagnostic inaccuracy. Biomarkers would offer a more accurate option to aid in the diagnostic process but currently only p16 (INK4A) has been established having clinical importance. Recent studies have recognized several promising biomarkers that have the potential to prove useful in HNSCC diagnostics.