Navigating Head and Neck Cancer: Advances in Diagnosis and Treatment, July 2025

Diagnostic innovations of head and neck cancers

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Abstract

Head and neck cancers (HNC) encompass heterogeneous malignancies with varied etiologies and clinical behaviors. The complexity of the HNC anatomical regions complicates tumor diagnosis, necessitating clinical, imaging, and laboratory tests for accurate diagnosis. Pathologists frequently confirm distinct neoplasm of HNC using light microscopy, often supplemented by immunohistochemistry (IHC) and molecular testing. The development of precision molecular testing can guide personalized therapies. Advances in radiology enhance HNC diagnosis, staging, and management. Diagnostic imaging establishes the size and extent of HNC and distinguishes tumor recurrence from post-treatment changes. Deep learning in artificial intelligence integrates imaging, demographics, histology, genomic data, or proteomic data to create predictive models. Emerging diagnostic modalities, such as the newly discovered IHC stains, liquid biopsy, and radiomics, are yet to be standardized for clinical use.