

SPEAKER

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From omics to clinical decision-making: advancing precision medicine in head and neck oncology

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Head and neck cancers represent a clinically and biologically heterogeneous group of malignancies, in which treatment decisions are still largely driven by anatomical staging despite substantial variability in outcomes. In recent years, the integration of multi-omics data, including transcriptomics and radiomics, has provided new insights into tumor biology and enabled more refined patient stratification beyond conventional clinical parameters. Gene expression-based classifications have demonstrated both prognostic and predictive value, while imaging-derived features offer a non-invasive approach to capture tumor heterogeneity and complement molecular profiling.

In this lecture, we will discuss how the integration of multi-dimensional data can support clinical decision-making in head and neck oncology. We will review current evidence on omics-driven stratification, the role of artificial intelligence in integrating heterogeneous data sources, and ongoing efforts to translate these approaches into clinical decision support systems. Finally, we will address key challenges related to implementation in routine practice, including data harmonization, model validation, and acceptability, and explore the emerging role of mobile health technologies in improving survivorship care and quality of life.

Stefano Cavalieri is a medical oncologist in the Head and Neck Medical Oncology Department at the INT in Milan and a tenure-track researcher at the University of Milan, Italy. His clinical and research activity focuses on head and neck and non-melanoma skin cancers, with particular interest in multi-omics integration, radiomics, and artificial intelligence to improve prognostic stratification and guide treatment decisions. He has contributed to national and international research initiatives on big data-driven decision support systems and digital health in oncology. He has authored over 100 peer-reviewed publications and is actively involved in collaborative research networks in head and neck oncology.

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