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Nomogram for predicting survival for patients receiving definitive chemoradiation in locally advanced squamous cell carcinoma of the head and neck: A secondary analysis of NRG/RTOG 0129, 0522, and 1016

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Background

The prognostic implication of HPV-mediated head and neck squamous cell carcinoma (HNSCC) is changing the approach to this disease in the cisplatin-based chemoradiation era. More recent trials provide new data to analyze factors influencing survival in this cohort. We aimed to find prognostic factors for survival in patients with HNSCC, assess outcomes by sex, and generate nomograms using data from 3 randomized trials.

Methods

This secondary analysis of 3 phase III randomized trials included patients age 18+ with pathologically confirmed HNSCC of the oral cavity, oropharynx, larynx, or hypopharynx. Training data from RTOG 0522/1016 were used to generate 3 models using different analytic approaches for both overall survival (OS) and progression-free survival (PFS) that were internally validated using cross-validation. The models with the highest C-indices were the Cox proportional hazards (CPH) models, which were then externally validated using data from RTOG 0129. Nomograms for OS and PFS at 2, 3, and 5 years were generated. Substaging for T/N categories was excluded to minimize heterogeneity between AJCC staging editions.

Results

721 patients from RTOG 0129, 891 from 0522, and 406 from 1016 met criteria for inclusion. The final multivariable CPH models for OS and PFS included age, sex, race, smoking history, primary site, p16 status, T category, N category, anemia (hemoglobin <= 13.5 g/dL for males, <= 12.5 g/dL for females), and Zubrod performance status. Nomograms to predict OS and PFS will be made publicly accessible at the time of manuscript publication. Both nomograms showed moderate to high predictive accuracy on validation dataset (C-index: OS 0.70, PFS 0.68).

Conclusions

Using a large cohort from 3 randomized trials of HNSCC patients receiving cisplatin-based chemoradiation, we developed internally and independently validated nomograms for prognostication of outcomes for individual patients using pretreatment clinical and patient characteristics. There was no association of sex with OS or PFS. To facilitate use and further validation of our nomograms, a free web-based tool is made available.

Legal entity responsible for the study

The authors.

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