



READ IT BEFORE YOUR PATIENTS

Head & Neck

Validation of Hearing Loss Prediction Tool for Cisplatin Chemotherapy and Radiation in Head and Neck Cancer Treatment

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IMPORTANCE

Hearing loss affects up to 88% of patients undergoing head and neck cancer treatment; however, there are few validated models to predict this outcome. A predictive post-treatment model for hearing loss will allow clinicians and patients to make well-informed decisions about treatment with cisplatin-based chemotherapies and radiotherapy.

OBJECTIVE

To validate a previously created predictive model for objective hearing outcomes and to assess barriers to using the prediction nomogram in general practice for patients newly diagnosed with head and neck cancer.

DESIGN, SETTING, AND PARTICIPANTS

This cohort study includes an evaluation of 105 patients (208 ears) and interviews with six clinicians. The patients were treated at a high-volume tertiary care hospital. Patient participants were newly diagnosed with head and neck cancer and treated at Siteman Cancer Center from 1 July 2018, to 31 December 2019, with radiotherapy both with and without cisplatin-based chemotherapy. Additionally, the clinicians involved in the care of patients with head and neck cancer were interviewed to assess implementation strategies.

EXPOSURES: Radiotherapy with and without cisplatin-based chemotherapy.

MAIN OUTCOMES AND MEASURES

Hearing defined by the audiometric pure-tone average of 1.0, 2.0, and 4.0 kHz.

RESULTS

A total of 105 patients (208 ears; mean [SD] age, 61 [11] years; 82 men [78%]) were compared with the development cohort to assess the similarities and differences in case mix. All patients underwent radiation therapy, 50 (48%) received cisplatin-based chemotherapy, and 67 (64%) had a surgical resection. The mean (SD) cochlear dose of radiation was 13 (12) Gy, and the mean (SD) total cisplatin dose was 238 (83) mg/m² for those undergoing cisplatin therapy. A calibration curve demonstrated that predicted and observed post-treatment pure-tone average were not significantly different. The model predicted a post-treatment pure-tone average greater than 35 dB (a common threshold for hearing aid consideration) with a sensitivity of 73% and specificity of 67% with an area under the curve of 0.71, showing good discrimination. Clinician interviews suggest the nomogram requires careful integration into patient counselling to clarify risks and benefits for treatment.

CONCLUSIONS AND RELEVANCE

The findings of this cohort study confirm this model's ability to predict post-treatment hearing outcomes in a unique population of patients. This model has the potential to inform pre-treatment counseling and post-treatment hearing evaluations for this patient population.

