

Novel AI Tool Offers Prognosis for Patients with Head and Neck Cancer

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A team led by investigators at Dana-Farber Cancer Institute and Mass General Brigham has developed and validated an artificial intelligence (AI)-based noninvasive tool that can predict the likelihood that a patient’s oropharyngeal cancer—a type of head and neck cancer that develops in the throat—will spread, thereby signaling which patients should receive aggressive treatment. The research is published in [Journal of Clinical Oncology](#).

“Our tool may help identify which patients should receive multiple interventions or would be ideal candidates for clinical trials of intensive strategies such as immunotherapy or additional chemotherapy,” said senior author [Benjamin Kann, MD](#), a radiation oncologist at Dana-Farber Cancer Institute and Brigham and Women’s Hospital and faculty member of the Artificial Intelligence in Medicine (AIM) Program at Mass General Brigham. “Our tool can also help identify which patients should undergo de-intensification of treatment, such as surgery alone.”

Treatments for oropharyngeal cancer, including combinations of surgery, radiation therapy, and chemotherapy, can be difficult to tolerate and may have lasting negative effects. Therefore, it’s important to identify subgroups of patients who may benefit from less or more intensive treatment approaches. One way to accomplish this involves assessing whether the patient has pathologic extranodal extension (ENE), which occurs when cancer cells invade beyond the lymph node into surrounding tissue. Currently, ENE can only be definitively diagnosed by surgically removing and examining lymph nodes.

To provide a method to assess ENE before treatment decisions are made, Kann and colleagues developed an AI-based tool that can take imaging data from computed tomography scans and predict the number of lymph nodes with ENE, an indicator of a patient’s prognosis and likelihood of benefiting from intensified therapy. When the tool was applied to imaging scans from 1,733 patients with oropharyngeal carcinoma, the tool was able to predict uncontrolled cancer spread and worse patient survival. Integrating the AI’s assessment into established clinical risk predictors improved risk stratification, leading to more accurate predictions of survival and cancer spread in individual patients.

“The AI tool enables the prediction of number of lymph nodes with ENE, which could not be done before, and shows that it is a powerful, novel prognostic biomarker for oropharyngeal cancer that could be used to improve the current staging scheme and treatment planning,” said Kann.

Adapted from a Mass General Brigham news release.

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