NEWS RELEASE

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Study finds different genetic mutation patterns for HPV-positive throat cancer patients based on smoking history

Preliminary findings from a study examining the genetic alterations in HPV-positive oropharyngeal squamous cell carcinoma were presented Thursday. Researchers found differences in mutations in HPV-positive oropharyngeal cancer based on whether patients were heavy versus light smokers.

CHAPEL HILL -- Smoking and infection with HPV, the most commonly transmitted sexually transmitted disease, are both risk factors for an increasingly common type of throat cancer. In a new study, University of North Carolina Lineberger Comprehensive Cancer Center researchers have found that distinct genetic mutation patterns emerge in people with HPV-positive oropharyngeal squamous cell carcinoma who are heavy versus light smokers.

Preliminary findings from the study, presented Thursday at the 2016 Multidisciplinary Head and Neck Cancer Symposium, could help inform treatment decisions for people with HPV-positive oropharyngeal squamous cell carcinoma and a smoking history, researchers say.

“Our major finding was that basically not all HPV-positive oropharyngeal cancers are created equal at a genetic level,” said Jose P. Zevallos, MD, MPH, FACS, an associate member of UNC Lineberger, an assistant professor and director of oncologic research in the UNC School of Medicine Department of Otolaryngology/Head and Neck Surgery and an adjunct assistant professor in the UNC Gillings School of Global Public Health. “When we stratify patients with HPV positive cancer by how much they smoke, we notice that patients who smoke less than 10 years have different mutations than patients who smoke more.”

Studies have shown that patients with HPV-linked oropharyngeal squamous cell carcinoma respond better to treatments than patients with HPV-negative cancer. The finding has led researchers to investigate whether they can still achieve a cure for HPV-positive oropharyngeal cancer patients while lowering the intensity of their radiation and chemotherapy treatment.

But Zevallos and his team want to establish mutational profiles of HPV-positive oropharyngeal cancer that could be used to better stratify patients’ risk and inform treatment decisions.

“We know that HPV-positive oropharyngeal cancer patients have excellent prognoses,” Zevallos said “Because of that excellent prognosis, there has been a lot of work around the country to create treatment protocols that are less intensive. Our study aimed to come up with a molecular criteria based on genomic mutations to better stratify their risk.”

The researchers used next-generation sequencing to analyze genetic mutations in 66 HPV-positive oropharyngeal cancer patients, who were also categorized into groups based on smoking history. Patients were stratified based on whether they had smoked more or less than 10 pack years, which would be equivalent to one pack of cigarettes a day for 10 years.

They found that disease-free and overall survival were better in the less than 10-pack year group, and differences in mutations between the two groups based on smoking history.

Mutations in genes such as TP53, CDKN2A, KRAS and NOTCH1 almost exclusively showed up in the more than 10 pack-year group, according to the study abstract, while HLA-A mutations were almost exclusively in lighter smoking group.

“What we notice is that there is a series of mutations that are exclusively found in patients who are heavy smokers, and a unique mutation in the HPV-positive non-heavy-smokers,” Zevallos said.

Zevallos that the findings indicate that physicians could be taking more into account than HPV status when considering whether to reduce the intensity of treatment for patients with this cancer type.

“Our goal should be when we see an HPV-positive patient in the clinic, we don’t automatically assume that patients will do very well,” Zevallos said. “We should use other criteria beyond HPV status to more effectively personalize their treatments.”

The preliminary findings were presented at the Multidisciplinary Head and Neck Cancer Symposium in Scottsdale, Ariz., on Thursday. The symposium is sponsored by the American Society for Radiation Oncology, the American Society of Clinical Oncology, and the American Head & Neck Society.

In addition to Zevallos, other authors included: E. Yim of the UNC Department of Otolaryngology/Head and Neck Surgery; P. Brennan of the International Agency for Research on Cancer in Lyon, France; A.Y. Liu of the UNC Gillings School of Global Public Health; J.M. Taylor of the UNC Department of Otolaryngology/Head and Neck Surgery; M. Weissler of UNC Hospitals; D. Anantharaman of the International Agency for Research on Cancer in Lyon; B. Abedi-Ardekani of the International Agency for Research on Cancer in Lyon; and N.N. Hayes of the UNC School of Medicine.

About UNC Lineberger
One of only 45 NCI-designated comprehensive cancer centers, the University of North Carolina Lineberger Comprehensive Cancer Center brings together some of the most exceptional physicians and scientists in the country to investigate and improve the prevention, early detection and treatment of cancer. With research that spans the spectrum from the laboratory to the bedside to the community, UNC Lineberger faculty work to understand the causes of cancer at the genetic and environmental levels, to conduct groundbreaking laboratory research, and to translate findings into pioneering and innovative clinical trials. For more information, please visit www.unclineberger.org.

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