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Increased oral pathogens, decreased bacterial diversity predict precancerous stomach cancer lesions

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Elevated pathogen colonization and a lack of bacterial diversity in the mouth were identified in people with precancerous lesions that could precede stomach cancer, finds a new study led by New York University College of Dentistry (NYU Dentistry) and New York University School of Medicine.

The findings, published in the November issue of the *Journal of Periodontology*, provide new evidence that the increase in pathogens associated with periodontal disease - a chronic, destructive disease in the gums and oral cavity - could contribute to the development of precancerous lesions of stomach cancer.

"Our study reinforces earlier findings that poor oral health is associated with an increased risk of precancerous lesions of stomach cancer," said Yihong Li, DDS, MPH, DrPH, professor of basic science and craniofacial biology at NYU Dentistry and the study's corresponding author.

The American Cancer Society estimated that 26,370 new cases of stomach or gastric cancer would be diagnosed in 2016, resulting in 10,703 deaths. Accumulating evidence suggests that chronic inflammation caused by oral bacterial infections may contribute to the development and progression of various types of cancer, including stomach cancer.

Although some risk factors - such as *H. pylori* colonization, cigarette smoking, and eating salt and preserved foods - have previously been confirmed to contribute to the development of stomach cancer, many new cases unrelated to these risk factors are diagnosed each year. Scientists have hypothesized that a group of pathogens may be responsible for causing periodontal disease and the resulting chronic systemic inflammation that may contribute to the development of gastric cancer.

This study assesses the association between periodontal pathogen colonization and the potential risk of developing precancerous lesions - including chronic atrophic gastritis, intestinal metaplasia, and dysplasia - that may predict stomach cancer.

The researchers studied 105 individuals scheduled to receive an upper endoscopy. After the endoscopic procedure and histopathologic evaluation, 35 people were diagnosed with precancerous lesions of gastric cancer and another 70 people of the same ages without precancerous lesions were included in the study as a control group.

The researchers performed full-mouth examinations to assess participants' periodontal conditions. Saliva and dental plaque samples were collected to evaluate colonization by several of pathogens - *P. gingivalis*, *T. denticola*, *T. forsythia*, and *A. actinomycetemcomitans* - and to characterize oral microbial diversity.

Compared with the control group, patients with precancerous lesions experienced higher prevalence of bleeding when probed (31.5 percent versus 22.4 percent), higher levels of two pathogens (*T. denticola* and *A. actinomycetemcomitans*), and less bacterial diversity in their saliva.

A further analysis, which took into account sociodemographic factors, oral health behaviors, and periodontal assessments, revealed additional

predictors of precancerous lesions: elevated colonization of three pathogens (*T. forsythia*, *T. denticola*, and *A. actinomycetemcomitans*), decreased bacterial diversity in dental plaque, and not flossing regularly.

The researchers concluded that the colonization of periodontal pathogens and the alternated bacterial diversity in the oral cavity are important factors that, when at higher or lower levels respectively, may contribute to an increased risk of developing precancerous gastric lesions.

"Based on our findings, treatment for chronic periodontal disease and control of periodontal pathogen infections should be included in future strategies for preventing stomach cancer," said Dr. Li.

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