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Editorial

From Plate to Stomach: Exploring the Dietary Influence on Gastric Cancer

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See "Daily Diet and Nutrition Risk Factors for Gastric Cancer Incidence in a Japanese Population" by Ayaka Takasu, et al. on page 602, Vol. 18, No. 4, 2024

Despite its downward trend in global incidence and mortality over the past few decades, gastric cancer (GC) remains a substantial global burden, ranking as the fifth most common malignancy and the fourth greatest cause of cancer-related death worldwide.[1] GC is a disease with complex pathogenesis. Among the myriad of risk factors for GC, addressing *Helicobacter pylori* (HP) infection has long been a pivotal focus of research and clinical interest. Consequently, the global prevalence of HP has significantly decreased from 52.6% before 1990 to 43.9% in adults during 2015 through 2022.[2] Therefore, it is now time to broaden our focus of interest to other modifiable risk factors, particularly nutritional factors. In the current issue of *Gut and Liver*, Takasu *et al.*[3] explored the association of daily diet and nutrition factors with the incidence of GC through a post-hoc analysis of a 6-year prospective trial that evaluated modalities for GC screening in high-risk areas in Japan. Their investigation began by calculating the daily nutrient intake from the self-administered food frequency questionnaire (FFQ), which included 47 food items, completed at study enrollment by more than a thousand study participants. After integrating other major risk factors for GC development, such as HP status and the presence of gastric atrophy, multivariable regression analysis was performed to reveal nutritional factors associated with GC incidence. They found that sodium intake (adjusted hazards ratio [aHR], 3.91; 95% confidence interval [CI], 1.52 to 10.04) and vitamin D (aHR, 2.75; 95% CI, 1.11 to 6.79) were positively associated with GC incidence, while soluble dietary fiber intake was inversely associated with GC incidence (aHR, 0.10; 95% CI, 0.01 to 0.91).

Many prospective epidemiological studies have demonstrated the association between high salt intake and the risk of GC. In a meta-analysis of 10 prospective cohort studies including 268,718 participants with follow-up of 6 to 15 years, D'Elia *et al.*[4] found that high salt intake was associated with an increased risk of GC. This clinical evidence is supported by experimental studies that found that high salt intake may enhance the carcinogenic activities of N-methyl-N-nitro-N-nitrosoguanidine and increase the colonization of HP.[5,6] The findings of the present study reinforce the previously acknowledged link between salt intake and the risk of GC at the regional community level, based on detailed FFQ data.

The association of vitamin D with GC incidence remains unclear. A meta-analysis by Yang *et al.*[7] showed that sufficient vitamin D levels are associated with reduced HP infection, thereby lowering the risk of GC. However, no randomized trials are yet to be reported, and some previous studies show conflicting results. These conflicting results may be attributed to the complex mechanism of the vitamin D pathway *in vivo*. Vitamin D is converted into calcidiol (25-hydroxyvitamin D) in the liver, which is converted to calcitriol (1,25-(OH)2D) in the kidney. In addition, sunlight exposure and various hormones involve a complex interplay in the synthesis and activation of vitamin D.[8] Therefore, the impact of vitamin D on the incidence of GC warrants further large-scale studies that take into account the various factors influencing the synthesis and activation of vitamin D.

It is notable that soluble fibers were inversely associated with GC incidence in this study. Previous studies have in-

dicated that dietary fiber intake is associated with a lower risk of GC. However, few prospective studies specifically confirmed the association of soluble dietary fiber with GC incidence. Consistent with the findings of this study, a population-based multicenter case-control study from the United States found an inverse correlation between soluble fiber intake and risk of GC (odds ratio [OR], 0.42; 95% CI, 0.30 to 0.59 for cardia GC and OR, 0.40; 95% CI, 0.29 to 0.55 for non-cardia GC).[9] Also, many previous studies have suggested a protective effect of high fruit and vegetable intake on GC development. However, it was unclear which nutrients in the fruit and vegetables were responsible for the protective effect. This study implies that soluble fiber rich in fruits and vegetables may be a key player in GC prevention. The authors suggested that soluble fibers rich in fruits and vegetables may slow the absorption of starch, which may reduce glycemic load, which is a risk factor for GC development. In addition, there is experimental evidence that butyric acid, a product of dietary fiber, induces apoptosis and cell cycle alterations in GC cells.[10] Further confirmatory studies are warranted regarding this matter.

In summary, this study represents a significant investigation into modifiable risk factors for GC in an era of declining HP prevalence. By analyzing dietary habits through regional population surveys, the study confirmed the established link between sodium intake and GC incidence. Additionally, it identified the need for further research on vitamin D, given the conflicting results observed. Importantly, the study also suggests a potential protective effect of soluble fiber, abundantly found in fruits and vegetables, against GC. We hope that this study will pave the way for more diversified and in-depth research into the impact of dietary factors on the incidence of GC.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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