

Comment on "Associations Between Tea and Cancer Risk in Two Umbrella Reviews"

Dear Editor:

With great interest we read the article entitled "Tea consumption and risk of cancer: an umbrella review and meta-analysis of observational studies" by Kim et al. (1). Currently, a lot of misleading, unnecessary, and conflicted meta-analyses and systematic reviews have been published. Therefore, an umbrella review is needed to systematically collect and integrate data, evaluate information on all clinical outcomes, and provide an expanded view of the evidence (2, 3). We appreciate the efforts made by the authors to assess the epidemiological support for cancer outcomes being associated with tea consumption using an umbrella review. Previously, we conducted an umbrella review assessing the association between tea consumption and multiple health outcomes, in which we also assessed the cancer risk related to tea consumption (4).

In the present umbrella review, 64 observational studies with 25 types of cancer outcomes were included. In our previous umbrella review, 68 meta-analyses with 21 types of cancer outcomes were identified. In both umbrella reviews, high consumption of tea was related to reduced risks of biliary tract cancer, leukemia, oral cancer, ovarian cancer, and thyroid cancer, and when considering the types of tea, high consumption of green tea was associated with reduced risks of breast cancer, endometrial cancer, and liver cancer. Additionally, the present umbrella review by Kim et al. identified the protective role of tea against gastric cancer and lung cancer, and of green tea against colorectal cancer. However, only the negative association between tea consumption and risk of oral cancer was supported by convincing evidence. Our previous umbrella review also assessed the association between tea consumption and cancer mortality and found that consumption of black tea could reduce the risk of cancer mortality significantly (HR: 0.79; 95% CI: 0.65, 0.97) (5).

However, our previous umbrella review suggested that when the temperature of the tea consumed was >55–60°C, the associations become harmful for gastric (6) and esophageal cancer (7). Similarly, drinking very hot tea (>60°C) was significantly associated with an increased risk of esophageal cancer (HR: 1.62; 95% CI: 1.15, 2.22) from a cohort during an average 10 y of follow-up (8). The mechanism might be the impairment of barrier function of the esophageal epithelium by thermal injury, the inflammatory

process associated with chronic irritation of the esophageal mucosa by hyperthermia, and mutations like higher rates of transitions of somatic G to A in CpG dinucleotides of the *Tp53* gene, which were related to nitric oxide synthase activity (9).

In conclusion, although current evidence has suggested the protective role of tea for several cancers, we do not recommend that individuals consume very hot tea.

Mengshi Yi
Turun Song
Yong Zhou

Department of Hepatic Surgery, West China Hospital, Sichuan University, Chengdu, China (MY); Department of Urological Surgery, West China Hospital, Sichuan University, Chengdu, China (TS); and Department of Gastrointestinal Surgery, West China Hospital, Sichuan University, Chengdu, China (YZ, e-mail: nutritioner@hotmail.com).

The authors reported no funding received for this study.

Author disclosures: The authors report no conflicts of interest.

References

- Kim TL, Jeong GH, Yang JW, Lee KH, Kronbichler A, van der Vliet HJ, Grosso G, Galvano F, Aune D, Kim JY, et al. Tea consumption and risk of cancer: an umbrella review and meta-analysis of observational studies. *Adv Nutr* 2020;11:1437–52.
- Ioannidis JP. Integration of evidence from multiple meta-analyses: a primer on umbrella reviews, treatment networks and multiple treatments meta-analyses. *Can Med Assoc J* 2009;181:488–93.
- Aromataris E, Fernandez R, Godfrey CM, Holly C, Khalil H, Tungpunkom P. Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. *Int J Evid Based Healthc* 2015;13:132–40.
- Yi M, Wu X, Zhuang W, Xia L, Chen Y, Zhao R, Wan Q, Du L, Zhou Y. Tea consumption and health outcomes: umbrella review of meta-analyses of observational studies in humans. *Mol Nutr Food Res* 2019;63(16):1900389.
- Tang J, Zheng JS, Fang L, Jin Y, Cai W, Li D. Tea consumption and mortality of all cancers, CVD and all causes: a meta-analysis of eighteen prospective cohort studies. *Br J Nutr* 2015;114(5):673–83.
- Huang Y, Chen H, Zhou L, Li G, Yi D, Zhang Y, Wu Y, Liu X, Wu X, Song Q, et al. Association between green tea intake and risk of gastric cancer: a systematic review and dose-response meta-analysis of observational studies. *Public Health Nutr* 2017;20(17):3183–92.
- Zheng JS, Yang J, Fu YQ, Huang T, Huang YJ, Li D. Effects of green tea, black tea, and coffee consumption on the risk of esophageal cancer: a systematic review and meta-analysis of observational studies. *Nutr Cancer* 2013;65(1):1–16.
- Sheikh M, Poustchi H, Pourshams A, Etemadi A, Islami F, Khoshnia M, Gharavi A, Hashemian M, Roshandel G, Khademi H, et al. Individual and combined effects of environmental risk factors for esophageal cancer based on results from the Golestan Cohort Study. *Gastroenterology* 2019;156(5):1416–27.
- Li ZG, Shimada Y, Sato F, Maeda M, Itami A, Kaganai J, Komoto I, Kawabe A, Imamura M. Promotion effects of hot water on N-nitrosomethylbenzylamine-induced esophageal tumorigenesis in F344 rats. *Oncol Rep* 2003;10:421–6.