

Overly hot drinks increase the risk for esophageal cancer

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An Iranian study reports that the consumption of beverages at very high temperatures roughly doubles the risk of developing esophageal cancer.

THERMAL INJURY

Very hot drinks were classified as Group 2A carcinogenic agents (probably carcinogenic for humans) by the International Centre for Cancer Research in 2016. This classification occurred as a result of observational studies showing that people who regularly consumed very hot beverages had a much higher than normal risk of developing esophageal cancer. For example, in the Golestan province of northeastern Iran, the locals traditionally consume tea in a particularly hot form and they also exhibit one of the highest incidences worldwide of epidermoid carcinoma of the esophagus, the most common form of cancer which afflicts this organ. A similar situation is found in South America where the consumption of mate (a stimulating beverage rich in caffeine) in a very hot form is quite popular, as well as in East Africa (e.g. Kenya) where tea is traditionally consumed very hot (up to 72° C), even by infants¹.

The link between very hot beverages and esophageal cancer is understandable because epidermoid cancers originate within the layer of cells which cover the walls of the esophagus (the epithelium) and it is thus probable that the repeated scalding of these cells by very hot liquids creates inflammatory conditions which increase the risk of mutations in the DNA of the cells and trigger the development of cancer. The constant replacement of cells damaged by the thermal injury also increases the probability of errors being introduced via DNA copying, which can contribute to the increased risk of cancer.

OVER 60°C, MORE RISK

One of the limitations of studies previously performed on the link between very hot beverages and the risk of esophageal cancer is that the temperature of the liquids was subjective, i.e. that the participants described the beverages as “scalding”, “hot” or “tepid” but without knowing the actual temperatures of the beverages.

To clear up this ambiguity, a team of Iranian researchers undertook a prospective study examining the tea drinking habits of 50,045 inhabitants of Golestan (the region of Iran where the incidence of esophageal cancer is very high)². At the beginning of the study, the researchers measured the beverage temperature at which the subject usually consumed the tea, as well as the average time elapsed between steeping tea with boiling water and the beginning of consumption. The participants were thereafter contacted at regular intervals in person or by telephone over a period of 10 years in order to follow their consumption. During this period, 328 esophageal cancers were diagnosed, with 96 % of them being epidermoid carcinomas.



By examining the link between these cancers and the habits of tea consumption, the researchers observed a significant increase in risk (1.5 x) in people who consumed tea at a temperature above 60°C, as well as in those who partook with the least delay after steeping. By objectively measuring the temperature of the consumed beverages, these results thus confirm that a link exists between very hot drinks and esophageal cancer, and thus suggest very strongly that drinkers of tea and coffee should take care that they allow their beverage to cool off a bit before consuming it.

ALCOHOL AND TOBACCO

This negative effect of very hot drinks can be particularly noxious for people who regularly consume alcohol as well as for those who smoke. For example, a Chinese study has shown that consuming more than 15 g of alcohol per day (which corresponds to about 1 glass) increases the risk of esophageal cancer linked to hot drinks by a factor of 5, whereas this increase is doubled for those who smoke regularly³.

Overall, these observations indicate that the development of esophageal cancer is strongly influenced by physical irritants such as very hot liquids, alcohol and tobacco, and it is obvious that reducing exposure to these conditions is paramount for the prevention of this cancer. This precaution becomes even more important when we recall that over half of the cells which line the walls of the esophagus reach a precancerous stage during the normal aging process⁴ and are thus much more susceptible to evolve into a mature cancer following repeated attacks by carcinogenic agents.

- (1) Munishi MO et al. Africa's oesophageal cancer corridor: do hot beverages contribute? *Cancer Causes Control* 2015; 26: 1477–1486.
- (2) Islami F et al. A prospective study of tea drinking temperature and risk of esophageal squamous cell carcinoma. *Int. J. Cancer.*, published online March 20 2019.
- (3) Yu C et al. Hot tea consumption and its interactions with alcohol and tobacco use on the risk for esophageal cancer: a population-based cohort study. *Ann. Intern. Med.* 2018; 168: 489-497.
- (4) Martincorena I et al. Somatic mutant clones colonize the human esophagus with age. *Science* 2018; 362: 911-917.