

Commented Summary from Current Medical Literature

Tea Drinking Habits and Oesophageal Cancer in a High-Risk Area in Northern Iran: Population Based Case-Control Study

Summary: In a recently published paper in the “British Medical Journal”, a joint collaboration of well-known international scientists represented by Islami et al. has tackled this issue.¹ In a well-designed, laborious case-control study in Golestan, Iran, they looked at 300 cases of esophageal SCC and 571 age and sex matched neighborhood controls, assessed the temperature of the commonly used drink “tea” among them and compared it between the two groups. After adjusting for several confounders including ethnicity, daily vegetable intake, alcohol consumption, tobacco or opium use, duration of residence in rural areas, education level and car ownership (the latter two as indices of socio-economic status), they found that consuming hot tea is associated with significantly increased chance of developing esophageal SCC. The adjusted odds ratio (OR) for developing esophageal SCC in those who reported drinking “very hot tea” was 8.16 (95% CI: 3.93 to 16.91) as compared to those taking warm or lukewarm tea ($P < 0.001$) and for those drinking “hot” tea the adjusted OR was 2.07 (95% CI: 1.28 to 3.35). According to Islami et al., 21.1% and 36.2% of the cases drank their tea “very hot” or “hot”, respectively. Self-claim of “hot”, “very hot”, and “warm or lukewarm” tea drinking correlated with the claimed time from pouring tea to its drinking by the individual (weighted kappa statistics: 0.69). They did not find any correlation between amount of tea consumed and development of esophageal SCC. They have also reported limited data of tea temperature measurement in addition to the self claims of tea drinking habits (as mentioned for the case-control study) from a large on-going cohort study in the same region. The authors conclude that it is probably the “hotness” rather than the “tea” which is responsible for this increased chance of SCC of esophagus. In an accompanying editorial, Whiteman suggests that people drink their tea at least 5 minutes after pouring it in their cups.²

Comment: Squamous cell carcinoma (SCC) of the esophagus is still a deadly cancer with less than 40% survival at one year.³ Despite all advances, the disease is usually diagnosed at a late stage when therapeutic options are limited, associated with high morbidity and essentially ineffective in a majority. Effective, practical screening methods are not yet available as well. Therefore, understanding the mechanisms underlying this disease and its etiologic factors are important issues in order to prevent esophageal SCC. Islami et al. have tried to clarify some aspects of these mechanisms.¹

Consuming hot herbal beverages in large amounts (maté) has been associated with esophageal SCC in South America and the association between hot tea and esophageal SCC has been suggested previously.^{4,5} But this study is the first of this nature firmly showing this relationship. Therefore, we now know that “unusual hotness” in the esophagus is associated with increased chance of esophageal SCC in Golestan, a very high-risk area for esophageal SCC. This knowledge will certainly fuel further investigations on the possible mechanism(s) of this association. But several points should be considered before looking at these data as a sinequanon for esophageal SCC pathogenesis. First, Iranians like to have their tea “hot”. This is apparent from folklores and common beliefs which say that tea should be “lip-burning” (Lab-Sooz) to be considered good. This is common practice in many parts of the country with much lower ASRs for esophageal SCC.^{6,7} Therefore, if the authors can back up their observation with similar findings in other regions where esophageal SCC is less common, then the link would be more meaningful. Second, when we find a risk factor for a disease, the community wishes to know the answer to the question that what would be the impact if we can eliminate the risk factor from the community. In this instance, if we can convince people to drink their tea at least five minutes after being poured, how many esophageal SCCs can be prevented each year, i.e. what is the “attributable risk” for drinking hot tea? This can only be answered through a long-term prospective cohort study, which is fortunately already going on in Golestan, results of which are eagerly waited.⁸ Having our limited data (i.e., 5.4% of the population drink their tea “very hot”, the ASR for esophageal SCC is 0.04% in Golestan, and that 21% of esophageal SCC cases report drinking “very hot tea”) it can be roughly estimated that the chances of a person living in Golestan and drinking “very hot tea” for twenty years to develop esophageal SCC would be about 3%. What percentage of this risk can be eliminated by abandoning hot tea drinking? Considering the high background risk for esophageal SCC in

Golestan and some unpublished data from the Golestan cohort, one can say about a third of this risk may be preventable by this precaution.^{6,9} On the other hand, as mentioned above, drinking hot or very hot tea is common-practice in Iran, but most other parts do not harbor such high incidence of esophageal SCC. If one compares the consumed tea temperature in high and low prevalence areas for esophageal SCC, or perform similar case-control studies in low prevalence areas, interesting clues may be unraveled.

How the hot beverage does contribute to development of esophageal SCC in Golestan? Is it the direct injurious effect of unusually high temperatures on esophageal mucosa that starts the carcinogenesis chain through repeated injury-repair or activation or deactivation of genetic and metabolic pathways active in carcinogenesis? Or the high temperature activates some carcinogen within the esophageal mucosa? If the former case holds true, then logically the oral cavity and the pharynx, which come into contact with hot tea first, should be affected more than the esophagus i.e., oral and pharyngeal carcinomas should be more prevalent among people consuming very hot tea or in areas where esophageal SCC is prevalent. This is not the case in these areas.⁶ Otherwise it may be hypothesized that the oral and pharyngeal mucosa are somehow protected from the noxious effects of hot beverages, while the esophageal mucosa is vulnerable. If the latter hypothesis holds true (i.e., mechanisms other than direct injury), then we still need to look for potential agents mediating this effect of hot tea.

The last point (but not the least) is that how "hot" is "hot"? As mentioned above, the case-control data show good correlation between self report of hot tea consumption and the duration between pouring the tea and drinking it, while the data from cohort do not correlate as strongly and that of the measured tea temperature. Looking at table-6 of Islami et al.'s report, one can assume that people can distinguish between "very hot" and "warm/lukewarm" relatively meaningfully, while the issue is blurred when it comes to "hot". Most (>80%) people reporting consuming lukewarm/warm tea had measured tea temperatures of less than 65°C, and most people reporting consuming "very hot" tea had measured tea temperatures of 70°C or more, while those reporting consuming "hot" tea have a relatively flat distribution between the three categories of measured tea temperature (i.e. <65°C, 65-69°C, >70°C). So it seems difficult to distinguish between "hot" and "very hot" and also between "lukewarm/warm" and "hot" on a three scale measurement tool.² Maybe asking a simpler question about hotness of the consumed tea would be more informative.

To conclude, this landmark paper has verified the relationship between the temperature of consumed common beverage (tea) in a high-risk area and esophageal SCC. Although this should not be generalized to lower risk areas indiscriminately but paves the way for further understanding of the mechanisms underlying one of the most deadliest human malignancies.

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