BMJ 2009;338:b610 doi: 10.1136/bmj.b610 (Published 26 March 2009)

EDITORIALS

Hot tea and increased risk of oesophageal cancer

Allowing tea to cool for five minutes before drinking is advisable

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In the linked case-control study (doi:10.1136/bmj.b929), Islami and colleagues assess the association between how people drink their tea and the risk of oesophageal squamous cell carcinoma.[1]

Cancers of the oesophagus kill more than 500 000 people worldwide each year, with the bulk of the disease occurring in discrete populations in Asia, Africa, and South America.[2 3] Despite recent increases in the incidence of adenocarcinomas of the oesophagus in industrialised nations,[4 5] the most common subtype of oesophageal cancer worldwide is oesophageal squamous cell carcinoma. Tobacco and alcohol are the main causal factors related to oesophageal squamous cell carcinoma in the West, but they are not implicated in non-Western populations that have very high rates of this disease. Nutritional deficiency,[6] viral infection,[7] and dietary toxins[8] have all been postulated as causal factors, although none can fully explain the extraordinary excess of cases of oesophageal squamous cell carcinoma seen in these populations.

An intriguing hypothesis is that repeated thermal injury to the oesophageal epithelium may initiate carcinogenesis, but the limited evidence to date is inconclusive. Previous studies have indicated that consuming hot maté (a South American herbal beverage) or hot alcoholic liqueurs increases the risk of oesophageal squamous cell carcinoma.[9-12] However, testing this hypothesis has been hampered by the difficulty of separating the effect of heat from the confounding effects of ingested products already known or thought to cause this cancer (alcohol, tobacco, and maté). A further challenge has been to obtain valid and reliable estimates of the temperature at which participants typically swallow food or beverages because all studies have relied on self reports of intake.

Islami and colleagues' study is the most compelling test to date of the thermal injury hypothesis for oesophageal squamous cell carcinoma in humans. The study was conducted in a population in northern Iran with a high incidence of the disease. The investigators first elicited the tea drinking preferences of 300 people with oesophageal squamous cell carcinoma and a matched group of 571 controls drawn from the same geographical area. When compared with cancer-free controls, the patients were more than twice as likely to report drinking their tea "hot" (odds ratio 2.07, 95% confidence interval 1.28 to 3.35) rather than "warm or lukewarm" and were eight times more likely to drink their tea "very hot" (8.16, 3.93 to 16.9). The findings were similar for rapidity of intake—people who drank their tea within two minutes had a five times higher risk than those who waited more than four minutes before drinking their tea. These are substantial increases in the relative risk of cancer, and although observational studies are prone to well known forms of bias, the investigators minimised methodological error as much as possible.

An important potential weakness was that the estimates of tea drinking temperature were based on self reports by the participants. To tackle this problem—and in an attempt to calibrate the reports of warm, hot, and very hot tea—the investigators conducted a second study in which they measured the actual temperature of the tea consumed by nearly 50 000 residents of the same province of Iran. Taken together, these studies provide persuasive evidence that drinking tea at temperatures greater that 70ºC markedly increases the risk of oesophageal squamous cell carcinoma.

Strengths of the study include the high rates of case ascertainment and control participation, which lessen the chance that biased selection of study participants introduced systematic errors. In addition, the almost universal consumption of tea in this population, coupled with the low rates of exposure to tobacco and alcohol, greatly reduces the likelihood of confounding that has bedevilled earlier studies. So although this study was conducted in a population with atypical and possibly unique patterns of exposure to substances that are commonly consumed, the findings are relevant to clinicians and researchers in many settings.

At the level of basic science, this report lends support to the notion that thermal injury may be a cause of epithelial cancers. The mechanism through which heat promotes the development of tumours warrants further exploration and might be given renewed impetus on the basis of these findings.

Given that randomised trials are unlikely to be conducted, any health advice must rely on these types of observational data. Replication of these findings is therefore desirable, but in the meantime, a precautionary approach should be taken in the region in which the study was conducted. Indeed, the consumption of hot drinks is common worldwide, although perhaps not at the scalding temperatures seen in Iran. It is

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therefore possible that thermal injury may underlie, at least in part, a proportion of cases of oesophageal squamous cell carcinoma elsewhere. It is difficult to imagine any adverse consequences of waiting at least four minutes before drinking a cup of freshly boiled tea, or more generally allowing foods and beverages to cool from "scalding" to "tolerable" before swallowing. These findings are not cause for alarm, however, and they should not reduce public enthusiasm for the time honoured ritual of drinking tea. Rather, we should follow the advice of Mrs Beeton, who prescribes a five to 10 minute interval between making and pouring tea, by which time the tea will be sufficiently flavoursome and unlikely to cause thermal injury.

Competing interests: None declared.

Provenance and peer review: Commissioned; not externally peer reviewed.

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Cite this as: *BMJ* 2009;338:b610

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