

Micronuclei in buccal smears: A potential tool to assess genotoxic DNA damage due to tobacco which may lead to oral cancer

Sir,

A 42-year-old young man had a tobacco chewing habit of more than 20 years. On the basis of micronuclei (MN) score 26, he was persuaded to quit.

He could successfully quit and was asked to come for MN score every 3 months. He did not come initially, but after 15 months, he was persuaded to get his MN score. This time it was 80, and on rechecking after a month, it was still high. An ear, nose, and throat surgeon examined the patient, and a suspicious lesion was biopsied, revealing an early squamous cell carcinoma. He was successfully operated with fibula graft.

In India and surrounding Asian countries, there is an increasing use of smokeless tobacco. This is seen extensively even in young school going children. In fact, it is not unusual to find changes like submucous fibrosis in youth around ages of 12–15 years. The habit is seen in rich, poor, rural, and urban settings.

MN are small extranuclear DNA particles formed when chromosome fragments in dividing cells do not get incorporated in the nucleus of daughter cell. This may arise from unrepaired dsDNA breaks. That means repair pathways have become errant. Malsegregation of whole chromosome can occur during anaphase and this can be due to hypomethylation in centromeric and pre-centromeric repeat sequences. In oral mucosa, the squamous epithelium is 6–7 layers. Damage due

to tobacco is likely to be in the basal layer, which has dividing cells. MN formation due to lack of integration into a single nucleus occurs here, and subsequently, these cells migrate upward. During migration, some such cells die and fail to reach up. One counts MN in these superficial cells.

Lessons learned from this case are that (1) even after quitting one may still get cancer, suggesting genotoxic effect continues for some time, (2) merely taking MN sample from buccal mucosa could persuade him to quit, (3) had we done MN score every 3 months we might have detected the cancer earlier and may have avoided reconstruction surgery, (4) though this man quit, it is possible in many cases that habitual chewers may not quit, but a second or third MN collection may reinforce quitting effort. Certainly, a rising MN score may help in persuasion, and (5) the habit is acquired at very early age, supporting need for screening in youth.

Thus, the analysis of MN in buccal is a biomarker of genotoxicity and can assist in predicting the carcinogenic effects of tobacco.

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