Hair Dye and Cancer: Reassuring Evidence of No Association

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The large American Cancer Society (ACS) cohort study reported in this issue of the Journal (1) shows conclusively that use of permanent hair dyes does not increase risk of cancer mortality. These results are a relief to the one third of U.S. women who use these permanent hair dyes. Even long use of hair dye for 20 or more years does not increase the total risk of death from cancer.

For many years, the potential for hair dyes to act as mutagens in vivo and as carcinogens in animal models has fueled concern that use of these agents may increase risk of cancer. The results from the large, prospective ACS study (1), conducted by Thun et al., offer reassuring evidence. Taken together with results from other studies (2-4), these data suggest that we must turn to other lifestyle factors to account for changes in cancer mortality among women over time. This study (1) is of sufficient size (over half a million women followed for more than 6 years, during which 9435 cancer deaths were confirmed) that the investigators are also able to examine relations with specific cancers. Even long durations of use of hair dyes do not increase risk of breast, digestive system, genital, hematopoietic, or brain cancers. Surprisingly, long durations of use are associated with decreased risk of urinary system cancers. There is no apparent explanation for this inverse association. It should be noted that there is a suggestion of increased risk of lung cancer with long-term use; however, this suggestion is nullified when the investigators control for cigarette smoking.

Rising breast cancer incidence has stimulated study of the possible association between use of hair dyes and this cancer. Previous studies (2,4), however, have not shown a strong association. In the prospective Nurses’ Health Study of 121,700 U.S. women aged 30-55 years in 1976, no increase in breast cancer incidence was observed among users of permanent hair dyes during 6 years of follow-up (2). Frequency of use, duration of use, and interval since first use were not associated with increased risk among women who had used hair dyes. As with the other cancers mentioned above, even 20 or more years of hair dye use in the cohort reported by Thun et al. (1) was not associated with any increase in mortality. Further study of hair dye’s relation with breast cancer is unlikely to be useful.

Strengths of the study design of the ACS cohort include the prospective data collection and the size of the population being followed. The large study size allowed the investigators to examine associations between subtypes of hair dye used by women and subtypes of cancer. No overall association was observed between hair dye use of any type and any type of hematopoietic cancer. However, from an etiologic perspective, potentially important relations were observed for long-term use of black hair dye. Women who used black hair dye for 20 or more years are a very small fraction of all users (0.6%). Nevertheless, they are at increased risk of developing non-Hodgkin’s lymphoma or multiple myeloma. It is noteworthy that this excess risk is based on five cases of the 941 hematopoietic cancers in this study. This finding is in partial agreement with previous data reported by Zahm et al. (5), who found higher risk among women who used darker colors of permanent hair dye such as black, brown, and red. Variations in (a) the magnitude of the association between the ACS study (1) and that conducted by Zahm et al. (5), (b) the types of hair dyes, and (c) the durations of use necessary to observe an increase in risk cannot readily be explained. In both studies (1,5), the number of exposed cases is small, reflecting the subgroup analysis that is necessary to uncover the association.

Several public health messages may be drawn from the results of the ACS study (1) regarding use of black hair dye and risk of multiple myeloma or non-Hodgkin’s lymphoma. First, the association arises only with long-term use. Given the small proportion of women who fall into this category (0.6% of users in the ACS cohort), the population attributable risk is small. Second, even if this association is causal, use of permanent hair dyes is unlikely to contribute substantially to the rising incidence of and mortality from non-Hodgkin’s lymphoma in the United States (6). Third,
given this association, women may be advised not to use black hair dyes for prolonged periods. Finally, regulatory measures may be implemented to label black hair dyes, as suggested by Thun et al. (1).

A potentially important scientific issue arising from these new data is the similarity in the association seen for non-Hodgkin’s lymphoma and multiple myeloma. This parallel finding is similar to the consistent associations reported for phenoxy herbicides and these two hematopoietic cancers in a recent report from the National Academy of Sciences (7).

In conclusion, the public health impact of hair dye use is exceedingly small and does not warrant major new investigations. However, it is probably worth continuing to monitor associations such as those reported for non-Hodgkin’s lymphoma and multiple myeloma. In particular, continued follow-up of the ACS cohort will provide new data to address the association between hair dye color and risk of specific hematopoietic cancers. The evidence for cancer risk in relation to the use of hair dyes is not sufficient to avoid hair dye use.

References


Notes

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