Re: Mortality From Lymphohematopoietic Malignancies and Brain Cancer Among Embalmers Exposed to Formaldehyde

The Journal recently published an epidemiological study by Hauptmann et al. (1) that focused on formaldehyde exposure and mortality from lymphohematopoietic cancer among embalmers. It concludes that duration of embalming practice is “... associated with statistically significantly increased risk of mortality from myeloid leukemia.”

The study is based on 6808 embalmers who died from 1960 to 1985 and were included in three earlier proportional mortality ratio studies (2–4). No proportional mortality ratios are presented in the new study, and so we calculated several. Comparison was with deaths among white men who were aged 25 years or older in the United States in 1979, the likely median year of deaths among the embalmers. For all lymphohematopoietic cancers, the proportional mortality ratio was 90 (95% confidence interval [CI] = 76 to 106) and, for the myeloid leukemias, it was 108 (95% CI = 70 to 156), which was based on 29 deaths. The proportional mortality ratio of 128 (95% CI = 35 to 328) for nasopharyngeal cancer was based on four deaths among the embalmers. Proportional mortality ratio studies have limitations and may be misleading. However, we suggest that their principal limitation (self-selection into the study group) is minimal in the embalmers study because of the geographic range (virtually nationwide) and time span of their starting employment (50 or more years).

Interviews with coworkers and next of kin of the decedent embalmers were conducted in 1990–1992. These interviews related to occupational exposures that occurred from the 1920s through 1985. Participation rates are not provided for these interviews. Six indices of formaldehyde exposure were derived for each subject from the interviews and from the
findings of an exposure assessment experiment (5). The new study includes no measurement of formaldehyde levels.

The study conducted a case–control analysis of 168 case subjects who died of a lymphohematopoietic cancer and 265 control subjects. Results are presented as odds ratios for three levels of exposure (compared with nonexposed) and the related trend tests for each of the six exposure indices. The analyses were done twice for myeloid leukemias. The results of the first set of analyses presented were implausible, with odds ratios averaging 11, because the referent group included only one case subject who had died of myeloid leukemia. We agree with the authors of the embalmers study that the second set of analyses, with a referent group of five case subjects and odds ratios averaging approximately 2.5, “. . . represent more reliable estimates. . .”

Surprisingly, the more reliable exposure–response analyses are not accompanied by their attendant $P$ values. Even more perplexing is that they were accompanied by the $P$ values obtained from the less reliable data. We did not attempt to estimate $P$ values from the more reliable analyses. But, viewing these data, we note minimal trends, at most, in the odds ratios for all six indices of exposure among exposed subjects.

We are left with a study that is described as positive for a formaldehyde–myeloid leukemia association among embalmers but which provides little evidence of an overall excess of myeloid leukemia among them and whose most reliable data on exposure–response relationships were not tested for statistical significance.

PHILIP COLE
HANS OLOV ADAMI
DIMITRIOS TRICHOPoulos
JACK S. MANDEL

References


Notes

Affiliations of authors: Department of Epidemiology, School of Public Health, University of Alabama at Birmingham, Birmingham, AL (PC); Department of Epidemiology, Harvard School of Public Health, Boston, MA (HOA, DT); Department of Epidemiology, Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada (JM).

Correspondence to: Jack S. Mandel, PhD, MPH, Department of Epidemiology, Dalla Lana School of Public Health, University of Toronto, 155 College St, Rm 638, Toronto, ON, Canada M5T 3M7 (e-mail: jack.mandel@utoronto.ca).

Drs J. S. Mandel, D. Trichpoulos, H. O. Adami, and P. Cole have received grant support from the Formaldehyde Council, Inc, for a different project. Dr. P. Cole has served as a consultant to producers and/or users of formaldehyde.

DOI: 10.1093/jnci/djq332
© The Author 2010. Published by Oxford University Press. All rights reserved. For Permissions, please e-mail: journals.permissions@oxfordjournals.org.