Re: Are Electric or Magnetic Fields Affecting Mortality From Breast Cancer in Women?

Recently in the Journal, Loomis et al. (1) reported a modest increase in breast cancer risk among women in certain electrical occupations. In an accompanying editorial, Trichopoulos (2) states that “at least six studies have examined breast cancer in women in relation to EMF [electric and magnetic fields], and none has been reported as supporting a causal relation.” He seems unaware of our report (3,4) of significantly increased breast cancer risk among women living near “high” powerline configurations that are demonstrably (5) associated with high magnetic fields.

Of the six studies he does cite, Trichopoulos asserts that five are of "high quality" or "superior design" (apparently because they are cohort studies). We disagree. Besides their low statistical power (1), most of these studies fall short because they neither provide nor cite any measurements that validate high EMF exposure in their "exposed" subjects: In two reports (6,7) in which people employed in the manufacture of electronic products were studied, risk from chemicals seems to be the focus, and EMF levels are not even discussed.

In a third report (8), the list of female "electrical occupations" provided includes no instance of the traditional electrical occupations where high EMF exposure has been demonstrated (9) and where Loomis et al. (1) found increased risk. Rather, the occupations listed seem similar to those of computer equipment operators, etc., where Loomis et al. did not see increased risk. [We know of no data establishing that such workers reliably received more power-frequency EMF than other workers; in one set of measurements, video display terminal emissions appeared unlikely to increase such exposure above that of other office workers (10).]

The fourth study (11), which was conducted in England, followed a cohort of 7631 subjects—19 who had lived near overhead power lines and 7612 who had lived within 50 m of a “substation.” A British “substation” refers to what, in the United States, would be called a large transformer. No measurements validate that addresses within 50 m of such transformers have EMF exposure reliably higher than that in other homes that, though farther from the transformer, may actually be closer to the powerlines serving the transformer, which are the main source of exposure.

The fifth study (12) does provide a range of magnetic field measurements, but the range was determined under atypical high-load conditions and does not assess what portion of the study area received high fields even then. Presumably, it is a modest portion because a very large distance from the studied wires is included as “exposed.” Furthermore, the authors consider their study group to be of a low socioeconomic level, which could obscure any increase in breast cancer standardized mortality ratio (J).

Finally, Trichopoulos (2) reports “no increase in breast cancer risk” for a “ . . . case–control study . . . on . . . breast cancer in relation to use of electric blankets (which double the background exposure to magnetic fields).” However, only all-night use of an electric blanket is likely to increase the total magnetic field exposure reliably (13); in fact, the study shows increased breast cancer risk for all-night users. [The odds ratio was 1.46 (0.96-2.20) for regular all-night users when compared with nonusers and 1.51 (1.03-2.22) when compared with all other subjects in the study (14,15).]

Caution in the interpretation of EMF studies is warranted. But a high degree of nondifferential exposure misclassification is already unavoidable in any epidemiologic study of EMF; therefore, one should question negative results from studies where use of an “exposed” group with doubtful exposure further biases results toward the null.

References

(2) Trichopoulos D: Are electric or magnetic fields affecting mortality from breast cancer in women? [editorial; see comment citations in Medline]. J Natl Cancer Inst 86:885-886, 1994
(13) Del Pizzo V: A model to assess personal exposure to ELF magnetic fields due to common household sources. Bioelectromagnetics 11:139-147, 1990

Note

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