Occupational Exposures to Extremely Low Frequency Magnetic Fields and Post-menopausal Breast Cancer

Labreche et al., (2003) conducted a case control study to assess the association between occupational exposure to extremely low magnetic frequency magnetic fields (ELF-MF) and risk if postmenopausal breast cancer. Since the field do not appear to have energy powerful enough to cause direct cell damage; ELF-MF increase cancer risk through possible indirect pathways such as interference with the production of melatonin allowing levels of estrogen and prolactin to increase, therefore, increasing the risk of developing breast cancer.

The study was conducted using 608 cases and 667 controls from the Canadian target population identified from pathology records departments and cancer registries from 18 major hospitals that treat breast cancer in Montreal. Menopausal women age 50-75 at time of breast cancer diagnosis were selected as cases. Controls were matched to the cases by age, newly diagnoses cases of women with other cancers, same time period, and hospital (Labreche et al., 2003). Data collection was obtained by in person or telephone interviews using a structured questionnaire regarding occupation throughout working lifetime and other risk factors such as age, height, weight, ethnicity, marital status, education, lactation history, family history, use of oral contraceptives and hormonal therapy, alcohol drinking, smoking, and body mass index. Hormonal receptor status as Estrogen or Progesterone positive or negative was used (Labreche et al., 2003). After adjusting for other accepted breast cancer risks Labreche et al. (2003) case-control study concluded that “there appears to be a small increased risk for breast cancer among post-menopausal women exposed occupationally to ELF-MF” with higher risks for exposures before age 35 with progesterone receptor positive tumors.

Conclusion

Based on the strengths of the study such as case-control design, population based, good response from the targeted population, and job history (occupation throughout working lifetime), and validity of the control group I think occupational exposures to low frequency magnetic fields is statistically associated to postmenopausal breast cancer in women even though a problems with misclassification of the exposure assessments for ELF-MF may have occurred in this study assessment.
Examples of cancers that have occurred during the history of occupational epidemiology.

1. According to Stellman (2003) the prototype of historical cohort studies is the study by R.A.M. Case of the Institute of Cancer Research at the Royal Cancer Hospital, London, on causes of bladder cancer in the British chemical industry. The goal of the study was to determine whether the manufactures of aniline, benzidine, $a$-naphthylamine, or $b$-naphthylamine could be shown to produce tumors of the urinary bladder in men. The study took place between 1920 and 1952 on all men who had been employed by 21 cooperating chemical firms for at least six months. The study concluded that the observed number of bladder cancer rates far exceeded the number of expected rates.

2. Mustard gas poisoning and a 1955 report of a two-fold increase in deaths from lung cancer among men who had been in World War I. Case and Lea in 1955 asserted the circumstances and dates of the mustard release that affected the military population. Rosters of men born between 1889 and 1893 (2,718 exposed to mustard gas, 1,855 hospitalized with pneumonia in 1918, and 2,578 with wounds of the extremities used as controls) were traced via the Veterans Administration's death records (Norman, 1975). The authors used non-exposed and exposed comparison groups, as well as confounding possibility of cigarette smoking and lung cancer nine years before publication of the US Surgeon-General’s Report on Smoking and Health (Stellman, 2003).

3. Coke oven workers and lung cancer. When coal is heated to temperatures above 350°C in the absence of air volatile compounds and an impure carbon name coke is formed. The coke is used for to reduce ores in blast furnaces in steel manufacture. Many of the byproducts used in this industry are carcinogens or carcinogen precursors. In 1972 Raymond and colleagues found excess of lung cancer in men employed at the ovens. Polynuclear aromatic hydrocarbons are now considered to be the major carcinogens in coke oven effluents (Stellman, 2003).

4. Smelting hazard is arsenic and lung cancer: ores of copper, lead, and zinc are commonly smelted in order to remove impurities, chief among which is arsenic. Pinto and McGill (1953) found high levels of urinary arsenic in 348 workers exposed to arsenic trioxide dust at ASARCO’s

References:

