Abstract No: 2-2

Cancer Risk on Residents of ^{60}Co-Contaminated Buildings in Taiwan - analyzed using the two-stage sampling approach

Shu-O Chiang[1], Chien-Hao Chen[2], Chuan-Jong Tung[3], Pesus Chou[4], Jacqueline Whang-Peng[5], Hung-Yi Chiou[6], Yi-Hau Chen[5], Li-Hui Yu[7], Lukas Jyuhn-Hsiarn Lee[8], Saou-Hsing Liou[1, 8]

[1]Graduate Institute of Life Sciences, Academia Sinica, National Health Research Institutes and National Defense Medical Center, Taipei, Taiwan., [2]ESTAT Statistical Consulting Co., Ltd., Taipei, Taiwan., [3]Department of Medical Imaging and Radiological Sciences, School of Medicine, Chang-Gang University., [4]Institute of Public Health, Yang-Ming University., [5]Academia Sinica, Taipei, Taiwan., [6]School of Public Health, Taipei Medical University., [7]Department of Health, Taipei City Government., [8]National Health Research Institutes, Miaoli, Taiwan.

Abstract

Purpose: This study attempted to investigate the effects of long-term, low-dozing ionizing radiation on the incidence of cancer in people living in radio-contaminated buildings using the two-stage sampling approach after correcting confounding factors.

Methods: This is a retrospective cohort study from 1982 to 2010. Demographic variables and migration data were collected from people who lived, worked or studied in 1,660 radio-contaminated buildings in northern Taiwan since their construction from 1982 onwards; the cumulative dose of radiation in the environment was estimated using the exposure dose data collected by the Atomic Energy Council. Stage-one cancer risk information was established by combining the basic information of the residents with the nationwide cancer registration data, national health insurance data, and national mortality data. The control cohort was established using a 1:10 matching ratio. Stage-two cancer risk information was established using epidemiological data on some of the RCB residents and the control cohort. The two-stage sampling approach was applied to combine data from both stages, also to control confounding factors, so as to further explore the correlation between radiation

and cancer.

Results: The incidence of cancers before correction, leukemia was the only cancer type that presented statistical significance (excluding chronic lymphocytic leukemia) (IDR = 1.66; 95% CI = 1.14-2.41). After correcting confounding factors with the two-stage sampling approach, risk of all cancers in the exposed cohort was found to be 0.89 times (ORa=0.89; 95%CIa=0.67-1.20) that of the control cohort. Although there was no increase in the overall risk of cancer incidence, there was a statistically significant increase in the risk of leukemia among RCB residents, which was 2.02 times (ORa=2.02; 95% CIa=1.25-3.27) that of the control cohort and showed a dose-response relationship, but there was no significant increase in risk of other types of cancer.

Conclusion: After correcting confounding factors with the two-stage sampling approach, when radio-contaminated buildings residents were exposed long-term to low-dose of Cobalt-60, there was no increase risk of overall cancer; however the risk of leukemia did have a statistically significant increase, indicating that long-term, low-dose radiation does have risks for developing a particular type of cancer.

Keyword: radiation, cancer, two-stage sampling approach