Risk of thyroid cancer among Chernobyl liquidators

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Abstract

While the increased risk of thyroid cancer is well demonstrated in people exposed to radioactive iodines in childhood and adolescence in the most contaminated areas around the Chernobyl power plant, following the accident which took place on 26 April 1986, the effect of exposure on adults remains unclear.

A collaborative case-control study of thyroid cancer was set-up, nested within cohorts of Belarus, Russian and Baltic countries liquidators of the Chernobyl accident, to evaluate the radiation-induced risk of this disease among liquidators, and to assess the roles of screening and of radiation exposures in the observed increased thyroid cancer incidence among liquidators.

The study population consisted of the cohorts of approximately 66,000 Belarus, 65,000 Russian and 15,000 Baltic countries liquidators who took part in the clean-up activities on the reactor site and in the 30-km zone around the Chernobyl nuclear power plant between 26 April 1986 and 31 December 1987. The liquidators were mainly exposed to external radiation, although substantial dose to the thyroid from iodine isotopes may have been received by liquidators who worked in May-June 1986 and by those who resided in the most contaminated territories of Belarus.

Information was collected on study subjects by use of a standardized questionnaire that was administrated during a face-to-face interview with the study subject and/or a proxy (a relative or a colleague). The interview included questions on demographic factors, time, place and conditions of work as a liquidator and on potential risk and confounding factors for thyroid cancer.

A method of analytical dose reconstruction, entitled RADRUE (Realistic Analytical Dose Reconstruction with Uncertainty Estimation) was developed within the study and applied to estimate individual doses to the thyroid from external radiation and related uncertainties for each subject. Approaches to

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derive individual thyroid dose estimates from inhaled and ingested iodine isotopes were also developed and implemented.

115 cases of thyroid cancer and 457 matched controls were included in the study. The main analyses were restricted to 107 cases of papillary thyroid carcinoma and their 423 matched controls with reliable information on work in the Chernobyl area. Most subjects received low doses (median 69 mGy). The doses were much higher for women (median 196 mGy) than for men (median 64 mGy).

Results of this study will be presented, together with their implications for radiation risk assessment and protection.

KEYWORDS: Epidemiology, Chernobyl liquidators, thyroid cancer.

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