

MAY HIGH NITRATE LEVELS IN DRINKING WATER INCREASE THE PREVALENCE OF RADIATION-RELATED THYROID CANCER IN BELARUS?

Drozd, Valentina¹; Demidchik, Yuri¹; Daniliva, Larisa¹; Kudelsky, Alexander¹; Branovan, Igor²; Saenko, Vladimir³; Rogounovitch, Tatiana³; Yamashita, Shunichi³; Biko, Johannes⁴; Reiners, Christoph⁴

¹The International fund "Help for patients with Radiation-induced Thyroid Cancer "Arnica", Minsk, Belarus; ²Project Chernobyl, New York, NY, USA; ³Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan; ⁴Clinic and Policlinic of Nuclear Medicine, University of Wurzburg, Würzburg, Bayern, Germany

Background/Purpose: The increase in thyroid cancer incidence in children of Belarus is causatively associated with exposure to ¹³¹I after Chernobyl. However, the correlation between cancer prevalence and thyroid dose may not always be straightforward

Methods: Average thyroid dose of 475 mGy have been documented in children in Gomel, 97 mGy in Mogilev and 77 mGy in Brest regions, all areas characterized by the similar extent of iodine deficiency, while the number of diagnosed thyroid cancers were 569, 55 and 223, respectively by 2001. In part, the increase was explained by the effect of ultrasound screening. However, within the screening projects, the prevalence of thyroid cancer accounted for 0.2-0.6% in Gomel, 0.3% in Brest, and by contrast only for 0.008% in Mogilev region. This might be indicative that not only radiation dose, iodine deficiency and ultrasound screening have determined the detection rates.

Results: Recently, Ward et al. (2010) have reported a correlation between nitrate intake and excess of thyroid cancer in USA. In Belarus, the average level of nitrate in groundwater increased from 1.1 to 41.6 mg/L during 1960-1990. The proportion of drinking water samples from the open wells with nitrate concentration exceeding the Maximum Contaminant Level was about 70% in Brest and Gomel, and in contrast only 20% in Mogilev region in 1990.

Discussion & Conclusion: The prevalence of thyroid cancer in radiocontaminated regions apparently matches the pollution of groundwater with nitrates. Further investigations are necessary to elucidate the effect of nitrate in combination with radiation on thyroid cancer risk.