Long-term effects of Chernobyl nuclear fallouts on Thyroid disease incidence in Brest region of Belarus

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Abstract

Thyroid cancer is an early detectable malignancy and the only proven medical consequence of the Chernobyl NPP catastrophe. This tumor is often masked with the benign thyroid nodules either preexisting in the individual or being widespread in the population. Ultrasound screening plays an important role in the early detection and differential diagnosis of thyroid nodular lesions. Screening research made in the framework of Belarussian Ministry of Public Health and Belarussian Red Cross projects showed the efficiency of the mass ultrasonic screening of the population in the affected areas.

Mobile diagnostic screening laboratory of Brest Endocrinological Dispensary is functioning for already 20 years, providing high quality diagnostic possibilities for all distant areas of the region. Primary screening cohort are individuals aged below 18 years old at the moment of catastrophe (born 1968–1987). Secondary priority are patients aged 18 to 35 at the moment of the disaster. During the screening session, an ultrasound examination is made with the assessment of the thyroid lesions revealed. Sonografical malignancy stratification is made on the basis of the score scale (a kind of TIRADS analog) developed in Belarus. Fine needle aspiration is recommended to be performed if required due to sonographic pattern. Unfortunately, FNA in technically not always available – reducing the immediate diagnostic accuracy and relying on the patient's compliance. Blood serum is drawn to determine a thyroid status of the individuals examined.

Currently a lot of attention is also played on the new cases of thyroid cancer in young children and adolescents, who are technically non radiation induced cases, but the incidence is still not reducing to the pre-Chernobyl level.

During the period of 2009–2015 over 50,000 patients were screened in total. The number of examined patients, born in between 1968–1987 is above 22,000 subjects. Thyroid nodular disease was diagnosed in 20% of cases (4,492 patients, primary screening group), with the amount of sonographically suspicious nodules reaching 11.5% (2,585 cases).

Thyroid status analysis in patients with the FNA performed showed average serum TSH concentration 3.1±1.0 mU/L (mean±SD) without any significant differences between Male/Female or Malignant/Follicular/Benign groups. Positive TPO-Ab's (> 100 IU/l) were found in 620 cases of the FNA-cohort.

Ultrasound screening decades after the Chernobyl accident showed a high prevalence of nodular thyroid disease (20%) and cancer in high-risk groups of exposed population of southwestern part of Belarus.