Session 1.3

Overview of Epidemiology of Thyroid Cancer in the Context of the Fukushima Accident

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Worldwide, thyroid cancer is among the ten most common cancers in women (8th in ranking) but less frequent in men (18th in ranking), with approximately 230,000 cases in women and 68,000 in men (1). Mortality from thyroid cancer is very low, most notably in developed countries, with an estimated 40,000 deaths on a global scale in 2012. Thyroid cancer includes a variety of malignancies, with papillary thyroid cancer being the most common subtype (around 80%) and follicular thyroid cancer the second most common one (around 10%). The predominance in women is striking but currently unexplained; in the Republic of Korea, where the highest incidence of thyroid cancer is observed, it is the most common cancer in women. Incidence rates have changed dramatically over the last decades in many countries, but on a different scale. While today's incidence rates in women are 2-3 times higher than in 1990 in both US whites and blacks, in Australia or in Denmark, there is little change in India, Uganda or Sweden. In Japanese women, incidence rates have doubled between 1980-1990 but remained relatively stable thereafter, with an indication of a further increase in the most recent years (1). Most of the increase appears to be related to better diagnostics, i.e. use of ultrasonography in clinical practice, plus increased use of computer tomography and magnetic resonance imaging; reflected in the fact that the increase is mainly seen in papillary thyroid cancers as small as 2mm (2). With its presumably long sojourn time, there is great potential for early detection and over-diagnosis of small thyroid cancers. The term "cancer" may raise fear in patients and clinicians, and labelling small indolent lesions as papillary thyroid cancer causes unnecessary distress; therefore renaming low risk lesions as micropapillary lesions of indolent course (microPLICs) to convey their favourable prognosis has been suggested (2). However, identification of prognostic markers remains of great importance in clinical management of micropapillary lesions. .

The aetiology of thyroid cancer is not well understood (1). Height and body mass index are moderately associated with thyroid cancer risk in both genders and iodine deficiency appears to be related to the risk of follicular thyroid cancer. Several inherited conditions are associated with different types of thyroid cancer. Ionizing radiation is a well-established risk factor, especially when exposure occurs during childhood. Exposure in childhood to iodine-131 was associated with a 5-8-fold increased risk of thyroid cancer as observed in studies of the Chernobyl nuclear accident (3), with the increased risk sustaining more than 25 years after the accident. Recently, a higher risk of thyroid cancer has also been reported among Chernobyl liquidators, demonstrating the relevance of exposure also in adulthood (4).

With the systematic thyroid screening with modern technology in the Fukushima prefecture and the nuclear accident in 2011, there are two factors that certainly and possibly affect the occurrence of thyroid cancer in the region. Within only two years after the accident a reported increase in thyroid cancer is highly unlikely to be related to the radiation exposure due to its very short induction period. In the long run, however, the strong effect of early detection and the possible effect of radiation exposure are more difficult to disentangle, and respective studies of individuals have to be set up today to allow follow up of the affected population in the future. In addition, the scope of investigation has to be widened beyond thyroid cancer, given that the mix of radionuclides released by the nuclear accident deserves paying attention also to other radiation-related cancers (3). In addition to the radiation exposure, behavioural changes in the population may alter their cancer risk profile, raising concerns that potential excess in future cancers might be related to indirect effects of the accident; focused primary prevention strategies to target this problem are urgently needed.

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(4) Kesminiene A, Evrard AS, Ivanov VK, et al. Risk of thyroid cancer among chernobyl liquidators. Radiat Res 2012;178(5):425-36.