Breast Cancer: Current Research

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Chernobyl-related thyroid cancer: possible over treatment

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Abstract

The reliability of early reports of the thyroid cancer (TC) incidence increase after the Chernobyl accident (hereafter accident) was doubted. The mishap gives a case of impressive contrast in analytic quality when the occasion. The ultrasonography and fine needle aspiration biopsy (FNAB), coupled with the superficial location of the thyroid gland and iodine deficiency in the area, resulted in the detection of numerous thyroid nodules, while suboptimal quality of histological specimens, insufficient experience with paediatric material and radiation phobia contributed to the overdiagnosis of cancer. The availability of children at schools and preschools for the mass screening explains the TC incidence increase predominantly in this age group.

Introduction

The registered incidence of paediatric TC in the former Soviet Union (SU) before the accident was low compared to other developed nations, apparently caused by differences in diagnostic quality and coverage of the population by medical examinations, which signifies that there was a pool of undiagnosed TC in the population prior to the accident. Some cases were probably brought from non-contaminated areas and registered as Chernobyl victims.

Accordingly, the "first wave" TCs after the accident were larger and less differentiated than those detected after 10 years, when advanced cases have been gradually sorted out by the screening. The misclassification of neglected cases as aggressive radiogenic cancers had consequences for the treatment; more details and references are in [1]. The equipment of histopathological laboratories was outdated in the 1990s; excessive thickness of histological sections hindered reliable assessment of morphological criteria. Bogus positive finding of TC was not prohibited after cytological and histological Assessments. If a thyroid nodule is found by an ultrasonic screening, FNAB is usually performed, which has a certain percentage of inconclusive results. In the wake of getting a cytological report in a possible structure (dubious for threat), a hemithyroidectomy, subtotal or absolute thyroidectomy has been performed.

Since 1991, total thyroidectomy has been used more frequently in Chernobyl-related cases. The surgical specimen is sent for pathological examination. After the in toto removal of supposed cancer, a pathologist may confirm malignancy also in cases with equivocal histology.

Gross dissection of surgical specimens was often made with blunt knives, without rinsing instruments and the board for cutting, often without access to water, which can result in the tissue deformation and contamination of the cut surface by cells mimicking malignancy criteria. High incidence of pediatric TC after the Chernobyl accident appears doubtful for a pathologist acquainted with diagnostic practice of that time. Ultrasonic thyroid screening was performed, and a large number of thyroid nodules found.Equipment of histopathological laboratories was poor and outdated; excessive thickness .The information about check by master commissions of post-Chernobyl pediatric TC affirmed the bogus energy: "because of histopathological confirmation, conclusion of TC was affirmed in 79.1 % of cases (federal level of verification - 354 cases) and 77.9 % (international level - 280 cases)" [2]. False-positive cases, not covered by verifications, have remained undisclosed. Some diagnostic criteria of TC were not mentioned by Russian-language literature used at that time. For example, in the widely used Atlas of tumour histopathology, the following is stated about thyroid nodules: "In severe dysplasia there appear cell groups with clearly visible atypia.

Therefore, the 3rd grade dysplasia is considered as an obligate pre-cancer, which histologically is hardly distinguishable from carcinoma in situ" [3]. Accordingly, the diagnostic formulations such as "follicular thyroid carcinoma without invasion" or "follicular carcinoma in situ", suggestive of false-positivity could be encountered [2]. It was not sufficiently understood by some pathologists that nuclear atypia is generally not regarded as a malignancy criterion of thyroid nodules while the concepts of carcinoma in situ and dysplasia are not applied to them. Our article describing mechanisms of the false-positivity, possibly active until today, has not been accepted by the main journal of Russian pathologists ArkhivPatologii. Potential motives to exaggerate Chernobyl consequences included the following: it facilitated

writing of dissertations, financing and international cooperation. The accident has been exploited to strangle the worldwide development of atomic energy. Furthermore, the mechanisms of the overestimation included unreliability of Chernobyl-related (and some other) research, originating from the former SU, a nonchalant attitude towards scientific misconduct in general and manipulations with statistics in particular. The misclassification of neglected advanced cases as aggressive radiogenic cancers gave rise to the concept that supposedly radiogenic thyroid cancers, at least those from the “first wave” after the accident, were more aggressive than sporadic ones. This had consequences for the practice: the surgical treatment of supposedly radiogenic TCs was recommended to be more radical. In the 1990s and later, the TC surgery in some institutions switched to a more radical approach especially in Belarus. The following treatment was recommended to the children with radiogenic TC: “Total thyroidectomy combined with neck dissections followed by radioiodine ablation” [4]; “Careful and complete removal of the lymph nodes is of great clinical relevance” [5]. External radiotherapy (40 Gy) was applied as well. The total thyroidectomy has been seen by some experts to be indicated regardless of the tumour size and histopathology [4,6]. At the same time, technical difficulties of parathyroid glands preservation were pointed out. Some experts regarded subtotal thyroidectomy to be oncologically not justified and advocated total thyroidectomy with a prophylactic neck dissection. Littler resections were respected to be "just adequate in remarkable instances of extremely little lone intrathyroidal carcinomas without proof of neck lymph hub inclusion on careful modification" [6].

This approach is at variance with a more conservative attitude to TC worldwide, also after the Fukushima Daiichi accident. Admittedly, the excessive radicalism has not been supported by other experts from the former SU, acknowledging that that the “radiation history does not appear to significantly affect long-term treatment results” [7]. Note that total thyroidectomy with neck dissection is associated with complications such as hypoparathyroidism and recurrent laryngeal nerve palsy.

Conclusion

In conclusion, appearance of radiogenic TCs after Chernobyl accident is not excluded, but their number and aggressiveness have been overestimated, which may cause overtreatment and a wrong concept about carcinogenicity of low-dose low-rate radiation exposures, especially from radioiodine.

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