Thyroid Carcinomas After Irradiation for a First Cancer During Childhood

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Précis: External beam radiotherapy (EBRT) during childhood is strongly associated with risk of developing thyroid carcinoma.

Introduction
Many studies have confirmed the association between therapeutic irradiation of the head and neck regions and the development of thyroid carcinoma 20 to 35 years later. The risk of developing thyroid cancer is dose-dependent. Dr. Florent de Vathaire and colleagues from the Institut Gustave Roussy, Villejuif, France studied the long-term risk of developing thyroid tumors after administration of fractionated high doses of external beam radiotherapy (EBRT) to the thyroid, and repeat their results in this publication.

Method
A total of 4,096 children who had survived childhood cancer for at least 3 years were included. Of those, 2827 had received EBRT. The average dose of radiation delivered to the thyroid was 7.0 Gy, but 1,164 children received less than 0.5 Gy while 812 others received in excess of 5.0 Gy.

Results
- 14 childhood cancer survivors who received EBRT developed thyroid cancer.
- The likelihood of developing thyroid cancer among all of the children who had received EBRT was 80 times greater than for the general population.
- All secondary carcinomas and all but one adenoma occurred in patients who had received EBRT for their first cancer.
- The peak incidence of thyroid carcinoma was 15 to 19 years after administration of EBRT.

Discussion
EBRT during childhood is strongly associated with risk of developing thyroid carcinoma. Ionizing radiation itself is a carcinogen (cancer-causing agent) of thyroid gland. Furthermore, increased secretion of thyroid-stimulating hormone (TSH) as a result of impaired thyroid hormone secretion may play a cancer-promoting role in this condition. The patients who received EBRT during childhood require routine screening for thyroid cancer and should be examined with greater attention than the general population.