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Mortality in survivors of childhood cancer diagnosed with subsequent thyroid cancer: A report from the Childhood Cancer Survivor Study.

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Background: Childhood cancer survivors are at increased risk of developing a subsequent thyroid cancer, particularly following radiotherapy. In the general population, thyroid cancer has a very low mortality rate. Mortality after a diagnosis of subsequent thyroid cancer in survivors is unknown.

Methods: We calculated the standardized mortality ratio (SMR) following the development of subsequent thyroid cancer in a cohort of 24,683 5-year survivors of childhood cancer diagnosed between 1970 and 1999 using the age-sex-calendar-year-specific general population all-cause mortality rates from the CDC as the reference rates. We estimated all-cause mortality post the diagnosis of thyroid cancer (time-dependent covariate), adjusting for development of other subsequent malignant neoplasms (SMN) and chronic health conditions (CHC), using a piecewise exponential model. Thyroid cancer-specific mortality among survivors was compared to SEER cases with thyroid cancer, adjusting for age, sex, race and calendar-year. SEER data was also used to compare thyroid cancer characteristics in childhood cancer survivors with thyroid cancer patients without a history of childhood cancer.

Results: Among 397 survivors with subsequent thyroid cancer, 63% were female, 83% had received radiotherapy for treatment of their primary childhood cancer with fields that included the thyroid gland, and 92% had at least one severe or life-threatening chronic condition. Thyroid tumor size was significantly smaller in survivors, with 33% of cases in survivors and 24% in SEER being less than 1 cm ($p < 0.001$). There were 82 deaths with 7 deaths due to thyroid cancer. Within the cohort of survivors of childhood cancer, the rate of all-cause mortality did not increase with a diagnosis of thyroid cancer, adjusting for development of other SMNs and CHCs (RR = 1.0, $p = 0.96$), but it was 7 times higher than that of the general population (SMR = 6.9, 95% CI 5.5-8.5). Compared to adults diagnosed with thyroid cancer in the general population, survivors with subsequent thyroid cancer did not have an increased risk of thyroid cancer-specific death (RR = 0.9, 95% CI 0.4-1.9). Mortality risk was higher among those with older age at subsequent thyroid cancer diagnosis, male sex, Black and Hispanic race and ethnicity and tumor size > 1 cm.

Conclusions: The rate of all-cause mortality does not increase with a diagnosis of subsequent thyroid cancer in childhood cancer survivors. This finding suggests that thyroid cancer screening in this population should be based on reducing morbidity since it likely will not provide survival benefit. Enhanced attention to CHC management may be critical for long-term survival.

Title:
Mortality in survivors of childhood cancer diagnosed with subsequent thyroid cancer: A report from the Childhood Cancer Survivor Study.

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