Renal carcinoma following therapy for cancer in childhood: A report from the Childhood Cancer Survivor Study

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Background: Limited data exists describing the incidence of and risk factors for subsequent renal carcinoma among long-term survivors of childhood cancer.

Methods: The study included 14,351 five-year survivors of childhood cancer diagnosed between 1970 and 1986 who participated in the Childhood Cancer Survivor Study. Chemotherapy and radiotherapy exposures were abstracted from medical records; total dose of radiation to the renal beds were estimated by a radiation physicist. Standardized incidence ratios (SIRs) were calculated using age-, sex-, and calendar-specific incidence data from the Surveillance, Epidemiology and End Results (SEER) program. Cumulative incidence was calculated with death as a competing risk. Poisson regression analyses were used to assess associations between diagnosis and treatment characteristics and the risk of subsequent renal carcinoma.

Results: Twenty-six survivors were diagnosed with a renal carcinoma at a median follow-up of 19.3 years (range: 1 month to 34.3 years) from study entry. Three patients were treated with radiotherapy involving the renal bed while nine received chemotherapy only. Seven patients received both radiotherapy and chemotherapy. Cumulative incidence of renal carcinoma at 20 years was 0.16% (+/-0.04%). The SIR was 8.1 (95% CI 5.3-11.8) among survivors when compared to the general population with increased risk for renal carcinoma observed among survivors of neuroblastoma (SIR 87.1, 95% CI 38.4-175.2), non-Hodgkin lymphoma (SIR 9.3, 95% CI 1.9-27.4), and bone tumors (SIR 7.0, 95% CI 1.4-20.4). In multivariable analyses, an increased risk of subsequent renal carcinoma was observed among survivors exposed to platinum-based chemotherapy (Rate Ratio 4.0, 95% CI 1.2-13.5), renal bed radiotherapy ≥5Gy (RR 3.5, 95% CI 1.5-8.4)..

Conclusion: While cumulative incidence is low, survivors of childhood cancer are at an eight-fold increased risk for subsequent renal carcinoma compared to the general population. In addition to a primary diagnosis of neuroblastoma, exposure to platinum-based chemotherapy, and radiotherapy directed to the renal bed increase risk for renal carcinoma.