

Increasing risk of chronic health conditions in aging survivors of childhood cancer: A report from the Childhood Cancer Survivor Study

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Background Survivors of childhood cancer are at an increased risk for treatment-related chronic health conditions during early adulthood. However, the incidence, severity, and spectrum of chronic health conditions in the fourth and fifth decades of life have not been well studied.

Methods Analyses included 14,358 ≥ 5 yr survivors of childhood cancer (median age at last follow-up 32.3 yrs, range 8.0-58.0; 21.4% ≥ 40 years) and a sibling comparison group (n=4,031). Self-reported health conditions were classified using NCI CTCAE 4.0 grading system. Analyses focused on two primary outcomes: severe/life-threatening/fatal conditions (grades 3-5), and multiple (≥ 2) conditions. Cumulative incidence of a new chronic health condition was calculated from age 26 yrs. Cox proportional hazards models adjusted for gender and race, were evaluated using age as the time scale.

Results Among survivors with no previous health conditions through age 25, the cumulative incidence for a new grade 3-5 condition by age 50 compared to siblings was 45.9% (95% CI 45.9-45.9) vs. 13.9%, (95% CI 13.9-14.0) and for new onset of ≥ 2 conditions 33.0% (95% CI 33.0-33.1) vs. 24.9% (95% CI 24.8-24.9) . Survivors ≥ 40 yrs of age had a 5.8-fold (95% CI 5.3 – 6.5) increased risk of a grade 3-5 condition compared to same age siblings, in contrast to those < 40 years of age (HR 2.7, 95% CI 2.5-3.0). A similar magnitude of difference was present for risk of ≥ 2 conditions (HR 2.7 vs. 1.2). In comparison to siblings, survivors ≥ 40 years of age had a significantly increased risk for: congestive heart failure (HR 15.7, 95% CI 9.2-26.7), myocardial infarction (HR 8.8, 95% CI 6.0-12.9), stroke (HR 8.6, 95% CI 5.6-13.2), joint replacement (HR 6.8, 95% CI 4.1-11.4), renal failure (HR 5.1, 95% CI 2.2-11.9), among other serious conditions.

Conclusions As they age, adult survivors of childhood cancer continue to develop new and serious health conditions at substantially higher rates than siblings. These data emphasize the importance of placing a greater focus on investigations of premature aging and organ senescence in this high risk population.

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