

THYROID DYSFUNCTION IN SURVIVORS OF HODGKIN'S DISEASE (HD): DATA FROM THE CHILDHOOD CANCER SURVIVOR STUDY (CCSS)

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Background: Treatment for HD has been associated with a variety of thyroid abnormalities, including hypothyroidism, hyperthyroidism, and thyroid neoplasms. Due to the small sample size and short follow-up time of most older studies, it has been difficult to appreciate the full extent of the problem as well as understand the potential interaction between patient (e.g., sex, age) and treatment variables.

Subjects/Methods: We have assessed thyroid status in 1728 (930 males) survivors of HD selected from 13,492 survivors of childhood cancer participating in CCSS. The CCSS is a cohort of 5-year survivors of childhood and adolescent cancer diagnosed during the time period 1970-1986 and established through a consortium of 25 centers. Thyroid abnormalities were ascertained as part of a 22-page questionnaire. HD survivors were a median of 14 (range 2-20) years of age at diagnosis and 30 (12-47) years of age at follow-up evaluation.

Results: The overall prevalence of *hypothyroidism* was 28%. Multivariate analysis revealed that sex, age at diagnosis, age at follow-up, and dose of neck irradiation (RT) each had a significant effect on the rate of hypothyroidism ($p < 0.001$).

Variable	Relative Risk (RR)	(95% CI)
Female sex	2.0	(1.5-2.7)
Age at dx >15	2.4	(1.8-3.3)
Age at f/u <21	2.6	(1.9-3.5)
Dose neck RT:		
<25 Gy	2.3	(1.1-5.1)
25-34.9 Gy	3.2	(1.5-7.0)
35-44.9 Gy	3.4	(1.9-6.5)
≥45 Gy	7.2	(3.9-14.5)

The overall prevalence of *hyperthyroidism* was 5%. The only variable predictive of hyperthyroidism was treatment with neck RT. *Thyroid nodules* were present in 9% of HD survivors. Multivariate analysis revealed that sex, age at follow-up, and neck RT each had a significant effect on the incidence of thyroid nodules ($p < 0.001$). RR was 5.3 (1.7-32.6) for neck RT, 3.7 (2.0-7.4) for female sex, and 2.4 (1.3-4.9) for age at follow-up >21 years. Thyroid nodules were reported by 23% of females >40 years of age.

Conclusion: Abnormalities of the thyroid are very common in survivors of childhood HD, particularly among females treated with neck RT.