

Radiation-induced hypothyroidism in head-and-neck cancer

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Radiotherapy for head-and-neck cancer has demonstrated a continuous increase in survival rates over a 20-year period. Due to treatment-related complications and higher survival rates, it is anticipated that both the incidence as well as the prevalence of late normal tissue reactions such as radiation-induced hypothyroidism will increase in the future.

Radiation-induced hypothyroidism causes metabolic alterations and weight loss amongst other symptoms. In order to predict the risk of radiation-induced hypothyroidism in the individual patient, it is necessary to understand which factors that impact on the development of metabolic alterations. It is well-known that additional treatment modalities such as surgery and chemotherapy will affect this risk, but other factors may be of more significant relevance such as subclinical hypothyroidism. Subclinical hypothyroidism is characterized by subtle symptoms and signs of mild thyroid failure and is considered to affect as many as 2-8% of the Danish population above 60 years of age. It is expected that due to the higher survival rates after radiation treatment for head-and-neck cancer, a large proportion of patients will develop a manifest hypothyroidism. The present study seeks to describe the prevalence of subclinical hypothyroidism in head-and-neck cancer patients by analyzing blood tests from patients treated within clinical trials of the Danish Head and Neck Cancer Group (DAHANCA). Modern radiation treatment techniques may reduce the total dose to the thyroid gland. However, it is uncertain as to what level treatment doses can be reduced without jeopardizing local tumor control. The tolerance dose of the thyroid gland to ionizing radiation is ill defined. This may be ascribed to the fact that the international experience has been gained from assessing a variety of total doses, fraction schedules, and treatment volumes of the gland. The current project will examine the development of hypothyroidism in patients who have undergone radical radiotherapy for head-and-neck cancer by assessing the absorbed radiation doses in individual patients from our dose planning system and compare dose-volume characteristics with thyroid function tests obtained after treatment. This may improve the power of risk-estimates of radiation-induced hypothyroidism whereby optimization of radiation treatment in individual patients is allowed.