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**Weight loss and associated factors among head and neck cancer patients undergoing particle therapy**

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Weight loss occurs frequently among patients with head and neck cancer during conventional radiotherapy. However, the impact of particle therapy on weight loss has not been examined among this population. The aim of this study is to evaluate the weight lost among patients with head and neck cancer during particle therapy, and investigate its associated factors. 126 adult patients who received particle therapy were included. Multiple linear regressions were used to analyze the related factors for percentage of weight loss during particle therapy. Related factors included gender, age, Karnofsky performance status (KPS), tumor location, stage, recurrence, treatment modality, total dose on the primary tumor, concurrent chemotherapy, prior treatment, pre-treatment BMI and nutrition risk, and total score of toxicity during particle therapy. Overall, critical weight loss occurred in 20% of the patients, and the mean weight loss was 1.4kg (2%) during particle therapy. None of acute toxicities were greater than Grade 2, except for Grade 3 oral mucositis in 7.1% of the patients. Results of multiple linear regression indicated that only radiotherapy modality (95% CI: -7.934--2.917,  $P < 0.001$ ) and total toxicity score (95% CI: -1.348--0.449,  $P < 0.001$ ) were significantly related to percentages of weight loss during particle therapy among head and neck cancer patients. Though weight loss and toxicities were less severe during particle therapy, it is crucial that early nutrition intervention should be implemented for patients with combined particle and photon therapy, or severe toxicities, who were in the high risk of weight loss.

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