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Abstract

Tumor control and quality of life following organ-sparing SBRT for reirradiation of head-and-neck cancer

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Objectives: To evaluate the efficacy, toxicity, and quality of life before and after organ-sparing SBRT in previously-irradiated recurrent head-and-neck cancer.

Methods: Chart review of 60 patients with recurrent H&N cancer in a previously-irradiated field who were treated with SBRT with a strategy of protecting Organs at Extreme Risk (OARExtreme) – structures that approached their radiation tolerance after prior radiation with a high risk of treatment morbidity. Delineation of GTVs and OARs was done with deformable image registration, integrating all images and the combined dose delivered by the previous treatment plan(s). The radiation tolerances of OARExtreme were calculated using total biologically effective doses (BED) for late toxicities and the total dose to all OARExtreme was kept at or below tolerance. Radiation was delivered utilizing a Volumetric Modulated Arc Therapy (VMAT) SBRT delivery system, with a prescribed dose of 40 Gy in the definitive setting or 35 Gy in the postoperative setting, delivered over 5 fractions. OARExtreme were used as anatomic references to accurately target radiation treatment during intrafraction verification to avoid overtreatment of these previously treated tissues. Patient-reported quality of life (PR-QoL) following re-irradiation was prospectively acquired using the validated MD Anderson Symptom Inventory Head and Neck Cancer Module (MDASI-HN), Dysphagia Inventory (MDADI), and Xerostomia Questionnaire. Late radiation toxicities were evaluated using the RTOG/EORTC scale. Local-regional control and overall survival were recorded.

Results: Patients who completed the prescribed treatment and who were followed for at least six months or until time of death were included for analysis. Sixty patients with 69 recurrences were treated: 30 (43%) in the midline (upper aerodigestive tract), 24 (35%) in the skull base, and 15 (22%) in the lateral neck. The vast majority of tumors had squamous cell histology (74%). The median dose delivered in the first course of radiation was 63.6Gy with a median interval of 16.5 months from radiation to recurrence of disease. 54% of patients underwent surgical resection for recurrent disease. Median volume treated with SBRT was 61.0cc, with a median V90 of 98.4% and D90 of 99.0%. Three grade 3 late toxicities were observed, occurring in two patients treated to the aerodigestive tract and one patient treated to the skull base. PR-QoL in patients with skull base recurrences was maintained between pre- and post-reirradiation in all measured domains of the MDASI-HN. Patients with upper aerodigestive tract recurrences showed reported stable quality of life scores on the MDADI with minimal worsening of

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functional scores after re-treatment. 1- and 2-year local control rates were 56% and 56%, respectively. 1-year and 2-year OS were 60% and 47%, respectively.

Conclusions: The potential for lower rates of severe toxicities with OARExtreme-protecting SBRT make it a promising salvage option for patients with in-field failure of their head and neck cancer, where traditional re-irradiation may have been avoided for concerns of intolerable side effects. This chart review demonstrates that delivering SBRT with an emphasis on protecting high-risk OARs is able to effectively provide local control in both the definitive and post-operative setting. SBRT with a focus on high-risk organs appears to provide long-term palliation while allowing patients to maintain their quality of life.