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Results of Re-irradiation with Stereotactic Radiotherapy in Recurrent Head and Neck Cancer

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Abstract

Objectives: Evaluation of treatment results in patients with recurrent head and neck cancer (HNC) treated with stereotactic radiotherapy (SRT).

Methods: One hundred and thirty-two patients with recurrent HNC who were treated with SRT between July 2007 and October 2015 were retrospectively evaluated. The treatment was applied by CyberKnife® (Accuray Inc., Sunnyvale, CA, USA in 119 (90%), and by Novalis® (Brainlab Inc., Feldkirchen, Germany) in 13 (10%) patients. Median age was 57 years (15-87 years). Seventy-eight (59%) patients were male, whereas 54 (41%) were female. The tumor was located in nasopharynx in 61 (46%), larynx or hypopharynx in 28 (21%), oropharynx or oral cavity in 20 (15%), and other regions of the head and neck in 23 (18%) patients, respectively. Median dose of the first radiotherapy (RT) dose applied was 66 Gy (24-74 Gy). At the time of recurrence median SRT dose was 30 Gy (15-50 Gy) with CyberKnife®, and 50 Gy (30-65 Gy) with Novalis®. Median gross tumor volume (GTV) was 38 cm3 (1-214 cm3); =50 cm3 in 78 (59%), and >50 cm3 in 54 (41%) patients. Median duration between the first RT and reirradiation (DFR) was 37 months (4-306 months); =40 months in 72 (55%), and >40 months in 60 (45%) patients.

Results: Median follow-up was 13 months (1-99 months). Another local recurrence and distant metastasis developed in 78 (59%), and 16 (12%) patients, respectively. During the follow-up 22 (17%) patients had complete response, and 15 (11%) had partial response. The lesion stayed stable in 25 (19%) patients; however it progressed in 64 (49%). The reason for death was the disease in 67 (51%), treatment-related complications in 10 (8%), and reasons other than disease in 3 (2%) patients. The 1-, 2-, and 5-year overall survival (OS) was 57%, 39%, and 16%; disease-free survival (DFS) was 49%, 31%, and 9%; local recurrence-free survival (LRFS) was 51%, 31%, and 9%; and distant metastasis-free survival (DMFS) was 55%, 35%, and 13%. Tumor location, GTV size and DFR were statistically significant factors for all survivals in the univariate analysis. In multivariate analysis GTV size for OS; tumor location, GTV size and DFR for DFS; tumor location and GTV size for LRFS; and GTV size and DFR for DMFS were statistically significant. Carotid blow-out syndrome (CBS) developed in 19 (14%) patients in the follow-up, and 9 were succumbed to this complication. For all patients with CBS the median maximum carotid dose (MCD) was 36 Gy (0-43 Gy); whereas the circumference of the carotid

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receiving at least 30 Gy was >1800 in 15 patients. In patients without CBS the median MCD was 33 Gy (0-65 Gy), and 44 patients received at least 30 Gy to >1800 circumference of the carotid. The risk for the development of CBS was significantly higher in patients whose MCD was >33 Gy, and the carotid circumference receiving at least 30 Gy was >1800 ($p=0.02$, and $p=0.04$, respectively).

Conclusions: The survival and local control rates were significantly higher in patients with recurrent HNC whose GTV was <50 cc, and DFR was >40 months. Best results were observed in patients with nasopharyngeal cancer. Extra caution should be applied to the carotid dose in patients undergoing reirradiation.