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

Sezin Yuce Sari, Mustafa Cengiz, Gozde Yazici, Gokhan Ozyigit, Huseyin Kivanc, Demet Yildiz, Ferah Yildiz, Fadil Akyol, Faruk Zorlu, Murat Gurkaynak

Corresponding author: Sezin Yuce Sari


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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, 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.

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
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.