

## **OC26: Analysis of the cochlear dose in head and neck cancer radiotherapy**

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**Introduction:** Internal hearing damage induced by radiotherapy (RT) can lead to sensorineural hearing loss (hypoacusia) due tumor's proximity with the auditory apparatus. Furthermore, the concurrent use of RT with chemotherapy (cisplatin) is known to increase toxicity.

**Objective:** To quantify the radiation dose delivered to the (ipsilateral and contralateral) cochlea in head and neck cancer patients with and without hypoacusia.

**Materials and Methods:** 99 head and neck cancer patients (nasopharynx, oropharynx, salivary glands and paranasal sinuses tumor cases), treated at Portuguese Institute of Oncology of Coimbra between 2007 and 2013 with intensity-modulated RT were included in this study. Patients were divided into two groups: no complications (grade 0) and with hypoacusia (grade 1-4). A statistical comparison between the mean dose delivered to the cochleas in patients with and without hypoacusia was made for the follow-up time: 7, 12, 18 and 24 months.

**Results and Discussion:** Hypoacusia incidence was around 30%. For all follow-up times and risk groups evaluated, the cochleas of patients with hypoacusia were irradiated with a significantly higher dose than the cochlea from patients without this complication. The ipsilateral cochlear mean dose in patients without and with hypoacusia was  $31.8 \pm 21.2$  Gy and  $47.3 \pm 17.2$  Gy ( $p < 0.01$ ), respectively. For the contralateral cochlea was  $26.3 \pm 22.0$  Gy and  $36.7 \pm 19.1$  Gy ( $p = 0.03$ ), respectively. Tumor location (nasopharynx and oropharynx), disease stage (T3-4 and N2-3) and radiochemotherapy showed to be factors related to a higher rate of hearing side-effects.

**Conclusion:** To reduce the risk of hypoacusia the dose in the cochlea must be minimized and should not surpass 45 Gy. Patients with more advanced tumors undergoing more aggressive treatments, such as concurrent chemotherapy, have a higher risk to develop hypoacusia.

### **References**

1. Bhandare, N. et al. (2007). Ototoxicity after radiotherapy for head and neck tumors. *Radiation Oncology*, 67 (2), 469-479.