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Late oral mucosa alterations after radiotherapy for head and neck cancer: cytological study of radiation induced epithelial cells injury

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Introduction and aims: Radiotherapy for head and neck (H&N) district malignancies may induce permanent tissue damage leading to multiple life-long side effects that place patients at continual risk for oral sequelae. In our study late toxicity after radiotherapy for H&N cancer has been assessed by exfoliative oral cytology. Matherials and methods: Eligibility criteria were: age between 30 and 80, a minimum of two-years follow-up after completion of 3D conformal radiotherapy for H&N solid tumors, with oral mucosa in the fields of exposure of therapy. From december 2011 to may 2012, 14 consecutive patients were enrolled at their programmed follow-up visit. They were 11 males and 3 females, mean age was 66.5 years (range 52-76), mean follow-up after radiotherapy was 47.3 months (range 24 –98), mean dose was 65.6 Gy (range 50-70.2) with conventional fractionation, mean overall treatment time was 58.8 days (range 43-88). Tumor prevalent localization was oropharynx and oral cavity (11 out of 14 patients). Seven underwent postoperative radiotherapy and six received concomitant chemotherapy. Smears were collected by scraping left and right cheeck mucosa with wooden tongue spatulas, then transferred to 4 dry glass slides (2 for each cheeck), fixed immediately with Biofix® and stained with modified May Grunwald Giemsa staining. Smears were examined under 400X power using a light microscope.

Results: All the smears collected showed cytological alterations: typical "folding" appearance of epithelial cells, a particular cellular phenotype marker of radiation injury, with enlarged and hypertrophic nucleus. In order to graduate the presence/absence of this specific cellular phenotype, we counted the folding cells as a percentage of all cells per dry glass slide for each cheek, made the average and finally scored them. On our preliminary data, we observed that in 9 out of 14 patients there was a linear relation between dose delivered and oral mucosa injury but in 5 out of 14 patients there was no correspondence between dose delivered and score of folding cells; 4 patients showed the same score in left and right cheek but dose was not equally distributed between the two sites and 1 patient conversely showed symmetric distribution of dose but not of score. We can hypotize that also immune system plays a key role in the variability of individual response of oral tissue to radiation damage; our data need to be supported by a larger sample.

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