

Pilot Study Using Technetium-99m Pertechnetate Sequential Radionuclide-Sialography to Assess Salivary Gland Function in Nasopharyngeal Cancer Patients on Radiation Therapy

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Abstract

Introduction: Nasopharyngeal carcinoma (NPC) is mainly treated by radiation therapy. A common complication of radiotherapy is xerostomia. Direct measurements of the amount of saliva produced using suction cups and volumetric assessments are cumbersome and time-consuming. Sequential radionuclide sialography is a reproducible and convenient method of measuring salivary function. **Materials and Methods:** Patients with newly diagnosed NPC underwent a pilot study using technetium-99m pertechnetate sequential radionuclide sialography to assess their salivary function before and at 3 months post radiation therapy. From the sialography, time activity curves were obtained for analysis of salivary function. The shape of the time activity curve with citric acid stimulation was classified into 4 types according to the degree of radiation-induced dysfunction. **Results:** All 14 patients had worse ($P < 0.005$) time activity curves for both parotids and submandibular glands after radiation therapy. All patients with abnormal curves before radiation therapy presented type IV (non-functioning) curve after radiation therapy. A ratio of pre- and post-stimulation counts allowed for quantification of the degree of stimulatory response. We found a significant decrease in R_c before and after radiation therapy for all salivary glands ($P < 0.001$). The salivary gland to background ratio, which is a reflection of the degree of salivary gland functional uptake, also had a significant reduction after radiation. **Conclusion:** It is feasible to use technetium-99m pertechnetate in the measurement of salivary gland function in nasopharyngeal cancer patients treated with radiation therapy.

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