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College of Dentistry

Oral Manifestations, Microbiological, Biochemical, and Immunological: a Comparative Study of Two Techniques of Head and Neck Radiotherapy

A Thesis

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Abstract

Background:

Head and neck cancers refer to a heterogeneous group of tumors in multiple anatomical sites in the head and neck structures, radiotherapy is one of the fundamental treatment option. Oral ecosystem is characterized by the interaction among the oral microbiota, salivary flow and components, and host immune response.

Aims of study:

To study the oral manifestations, salivary flow rate and salivary markers including; immunoglobulin A, interleukin-6, tumor necrosis factor-α, α-amylase and total salivary protein and oral microbiota, in head and neck cancer patients before and after two techniques of radiotherapy and compare them with healthy control group, also to evaluate the influence of vitamin D supplementation on the mentioned study parameters.

Subjects, Materials and methods:

The study included thirty looking healthy individuals as control group and two patients groups with head and neck cancer: the first group consisted of 30 patients who were treated with three-dimensional conformal radiotherapy and the second group consisted also of the same patient's number but treated by intensity-modulated radiation therapy.

Oral examination, oral swab and salivary samples were collected before the first session and after the last session of radiotherapy at Middle Euphrates Oncology Center/ Najaf-Iraq.

From the (60) patients included in this study, 28 patients were supplied with vitamin D during radiotherapy and the remaining 32 patients were not supplied.

Results:

The present study did not record any oral manifestations in all patients before starting the radiotherapy. The most frequent oral manifestation associated with radiotherapy was oral mucositis (82%) followed by xerostomia (78%), taste alteration (63%) and oral candidiasis (45%).

The levels of salivary immunoglobulin A, interleukin-6, tumor necrosis factor-α and total protein significantly higher (P=0.04, P=0.03, P=0.04 and P=0.04 respectively) in patients before radiotherapy compared to the control group.

Total salivary protein, salivary tumor necrosis factor-α and interleukin-6 increased significantly after radiotherapy, while salivary flow rate, immunoglobulin A and α-amylase were significantly decreased when compared to their baseline levels before treatment.

Xerostomia percentage was significantly higher (P=0.032) in patients treated by three dimensional conformal radiation therapy than other group treated by intensity-modulated radiotherapy. In addition, salivary flow rate and α-amylase were significantly higher (P=0.001 and P=0.03 respectively) in intensity modulated radiotherapy radiation therapy group than other group treated with three-dimensional conformal radiation therapy.

Streptococci and pseudomonas were the most frequent gram-positive and gram-negative bacteria isolated respectively, the oral cavity of patients before and after radiotherapy.

There were a significant increase in the percentages of *beta-hemolytic streptococci(P=0.028), staphylococci aureus(P=0.001) and epidermides(P=0.02), gram-negative bacilli(P=0.006)* and *candida albicans* (P=0.013) after radiation therapy.

No influence of vitamin D supplementation on all study parameters except the incidence of oral candidiasis was significantly lower (P=0.03) in patients group with vitamin supplementation than other group without supplementation.

Conclusions:

All the oral manifestations recorded were related to radiotherapy and not to disease itself.

The levels of salivary immunoglobulin A, interleukin-6, tumor necrosis factor-α and total protein were significantly elevated in patients before radiotherapy.

Overall, intensity-modulated radiation therapy was better in preserving saliva secretion and level of salivary amylase than three dimensional conformal radiation therapy.