



Radiotherapy of Malignant Tumors of the Head and Neck - Complications in the Oral Cavity



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Abstract

The intense and extensive impact of antineoplastic treatments in the mouth area, during and after the end of anti-cancer treatment has now been recognized internationally. Oral complications will occur in almost all patients who undergo radiation therapy for malignant head and neck tumors. The health status of the teeth, periodontium and oral mucosa is an important factor contributing to the development of oral complications during and after anticancer treatment. This work emphasizes the necessity of dental evaluation in the context of preparing the patient for radiation therapy 2-4 weeks before the start of treatment and describes the effects of radiation therapy on the oral cavity, especially when the necessary oral hygiene has not been achieved prior to it. Studies have shown that approximately 50% of head and neck tumor patients undergoing radiation therapy are expected to develop candidiasis. Candidiasis in the mouth causes burning, dysgeusia, worsening of mucositis, dry mouth and dysphagia. Moreover, dental and periodontal abscesses develop mainly in patients with poor oral hygiene and in teeth that had a problem and were not treated before the start of chemo-radio-treatment. Furthermore, xerostomia is another disorder that is directly linked to radiation therapy and negatively affects all the functions of the mouth, chewing, swallowing, taste, speech. Changes in taste, fibrosis of the tissues of the oral cavity, larynx and throat are important chronic complications in patients who have undergone radiation therapy for head and neck tumors. Finally, osteoradionecrosis of the jaws is also an important chronic complication of radiotherapy, it occurs more often in patients with poor oral health and when dental interventions are performed, mainly extractions, during or immediately after the end of radiation therapy.

Keywords: Radiotherapy oral complications; Osteoradionecrosis; Mucositis; Xerostomia; candidiasis; Oral bacterial infections

Introduction

The intense and extensive impact of antineoplastic treatments in the mouth area, during and after the end of anticancer treatment, has now been recognized internationally. Oral complications will occur in almost all patients who undergo radiation therapy for malignant head and neck tumors [1]. The World Dental Federation (FDI) and the Oncology Community today consider the care of the oncology patient's mouth an "urgent need" and a public health problem, therefore they emphasize the necessity of restructuring the cancer care delivery system and the participation of dentists in the multidisciplinary approach [2]. The state of health of the teeth, the periodontium and of the oral mucosa is a very important factor, which contributes to the development or worsening of complications in the mouth, during and after anticancer treatment [3].

Chemo-radio-mucositis

As part of preparing the patient to undergo radiation therapy, a dental evaluation should be included 2-4 weeks before the start

of treatment. Patients with poor oral hygiene, with problems in the oral cavity such as gingivitis, periodontitis, extensive caries, badly crafted fillings and prosthetic works in combination with the type of epithelium, have a high probability of developing chemo-radio-mucositis [4]. Chemo Mucositis occurs approximately 5-7 days after the administration of the chemotherapy regimen and varies in duration from a few days to weeks, depending on the type of chemotherapy, the chemotherapy regimen, the combination of chemotherapy with radiation, and the occurrence of infection. Radiation mucositis appears about a week after the start of treatment, usually in the form of erythema and then painful ulcers develop, which worsen until the end of radiotherapy and it takes 2-4 weeks for the ulcers to heal after the end of therapy [5]. As has been shown, the microbial load of the mouth and the state of the patient's immune system play an important role. Patients with advanced actin mucositis and patients receiving contemporary chemotherapy were found to have an increased risk of herpetic complication [6].

Candidiasis

Approximately 50% of head and neck tumor patients undergoing radiation therapy with or without concurrent chemotherapy are expected to develop candidiasis. A significant increase in the population of *Candida* in the mouth is observed during radiotherapy of malignant head and neck tumors up to 6 months after radiotherapy [7]. The development of candidiasis favors the onset or worsening of radio mucositis, and at the same time the appearance of mucositis favors the development of candidiasis. Both inflammatory conditions interact and burden the oral mucosa, and this is the reason of the difficulty in their differential diagnosis that is reported by most authors. Candidiasis in the mouth causes burning, altered taste, worsening of mucositis, increased sensation of dry mouth and difficulty in chewing and swallowing [8].

Bacterial infections

Dental and periodontal abscesses develop mainly in patients with poor oral hygiene and in teeth that had a problem and were not treated before the onset of chemo-radiotherapy. The majority of bacterial infections in the mouth are secondary to ulceration during anticancer therapy [9].

Xerostomia

Dry mouth is directly related to radiation therapy and negatively affects all mouth functions, chewing, swallowing, taste, speech. Patients with xerostomia may have more frequent fungal infections and dental caries. The most important factor for the development of xerostomia after radiation therapy appears to be the mass of salivary glands included in the radiation field, the total radiation dose, and the duration of radiation therapy. Initial saliva flow and constitution still play a role according to some researchers. The development of acute caries, mainly around the necks of the teeth, is the most characteristic adverse effect of dry mouth [10]. Patients must adapt to new dietary conditions. It is characteristic that the quality of life in many of them is measured by the degree of function and intolerance in the mouth as a result of the degree of xerostomia. Particularly important is, as a consequence of the reduction of dry mouth, the beneficial effect and protection of the dental and periodontal tissues from the administration of amifostine [11]. Changes in taste, fibrosis of the tissues of the oral cavity, temporomandibular structure and neck are important chronic complications in patients who have undergone radiation therapy for head and neck tumors.

Osteonecrosis

Osteoradionecrosis is a potentially serious late complication. It is a pathological process that occurs after the irradiation of the osteal tissue, and it is characterized by persistent ulceration of the mucosa with exposure of the jawbone. Osteoradionecrosis of the jaws is an important chronic complication of radiotherapy, it

occurs more often in patients with poor oral health and in patients who have undergone dental interventions, mainly extractions, after the end of radiotherapy. In patients who will undergo radiation therapy, teeth that may contribute to the development of osteoradionecrosis should be extracted [12,13]. The mandible, due to the initially poor vascularity, is the main site of occurrence of osteonecrosis, while the upper jaw is affected in a very small percentage. Deciduous patients are affected more often than edentulous patients, and patients who needed tooth extractions before and especially after radiation therapy showed an increased risk. Predisposing factors are increased radiation dose, old age, gender, proximity of the field to bone, poor general health, poor oral health, smoking, alcohol [14].

Performing bloody dental procedures should be done at least 14 days before head and neck radiation therapy and 7-10 days before chemotherapy so that for healing can proceed. Endodontic treatments must be completed at least 7 days before radiation therapy [15]. The treatment of osteoradionecrosis varies according to the severity of the clinical picture and includes conservative treatment with antibiotics, good oral hygiene, local antiseptics, hyperbaric oxygen, combined with surgical removal of the dead jawbone by a specialized maxillofacial surgeon in consultation with the patient's treating oncologist. After radiation therapy, a schedule of patient reviews is necessary every month for the first 6 months, every 3 months for the next 2 years and then every 6 months for lifetime [16-22].

Conclusions

The quantitative and qualitative change of the oral flora and the development of local infections indicate the important role of the oral cavity in the development of systemic complications during anticancer treatment as well as the need for vigilance and constant monitoring of the mouth. Early recognition, diagnosis and treatment of oral mucosal complications during anticancer treatment is critical for the administration and completion of the treatment within the planned time, in order to achieve as excellent a therapeutic effect as possible, to reduce morbidity and to maintain quality of life of the already burdened cancer patients.

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