

Oral Manifestations of Cancer Treatment

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Abstract. Cancer is considered one of the diseases that most affects individuals around the world and due to the few routes of intervention and its potential metastatic nature, it can generate oral manifestations. Currently, antineoplastic treatment is established by radiotherapy, which consists of exposure to ionizing radiation in the region affected by cancer cells, and chemotherapy, which is the administration of substances that compromise cellular functioning. Given the approaches used, the presence of manifestations that compromise the functional integrity of the oral cavity and adjacent structures was noted. Therefore, the objective of this paper has focused on describing the main oral complications in patients undergoing antineoplastic treatment. As methodological procedures, a literature review was evaluated with the keywords “Antineoplastic protocols”, “Cancer symptoms”, “Oral health” and “Oral manifestations”, through a bibliographic search carried out in the databases: National Library of Medicine (PubMed), Scientific Electronic Library Online (SciELO) and Latin American and Caribbean Literature in Health Sciences (LILACS). As requirements, only the inclusion of articles in English and Portuguese is established. Infections, development of oral mucositis, osteoradionecrosis, trismus, loss of taste and xerostomia are admitted as complications in cancer patients. Therefore, dental evaluation before, during and after cancer treatment is essential to promote the quality of life of these patients.

Keywords. Antineoplastic Protocols, Cancer Symptoms, Oral Health, Oral Manifestations

1. Introduction

Among malignant neoplasms, cancer is one of the most attenuating diseases that weaken the health status of the patient, being considered one of the main causes of death in the world, analyzing the establishment of risk factors such as smoking, alcoholism, sedentary lifestyle and the aging society [1].

It is a disorderly growth of cells in the organism, when there is no control of the biological process of cell multiplication, there is an abnormal formation of cells in rapid development invading adjacent tissues, generating metastases in the same or in a different site of the primary one, which may be resistant to the chosen therapy and lead to death. [2, 3].

The methods included and available for the treatment of cancer today are radiotherapy, oncological surgery, chemotherapy and bone marrow transplantation, which can be used in combination or isolated depending on the response to the therapeutic modality employed. Currently, these intervention protocols do not have a favorable prognosis for the patient, due to their harmful effect on the integrity and functionality of oral health, not

only affecting tumor cells, but also causing damage to cells under normal conditions, which enables the development of oral lesions [4,5,6].

Non-surgical antineoplastic interventions for cancer patients are strongly associated with types of acute and chronic oral complications such as xerostomia, high risk of hemorrhage, trismus, mucositis, osteoradionecrosis, hypogeusia, infection *Candida*, herpes simplex (HSV) and varicella-zoster (VSV) [5, 6].

The process of oral manifestations resulting from this type of treatment depends on a number of factors, from the patient's clinical profile, past medical and dental history and oral health conditions [7]. Radiotherapy has potential harmful activity to the endocrine system and oral cavity when exposing ionizing radiation to the head and neck segment in individuals undergoing cancer treatment, while chemotherapy affects systemically depending on its substances [3, 8].

The dental management of cancer patients is still not a frequent part of the daily routine of dentists, this article aims to carry out a literature review in order to describe the oral complications resulting from

antineoplastic treatment for cancer, as well as as the main means of intervention for these oral conditions.

2. Research Methods

This paper integrated the main oral clinical manifestations in patients undergoing antineoplastic treatment, considering the acute and chronic effects of this therapy in the oral cavity in the literature. For research, it is understood that cancer treatment with radiotherapy or chemotherapy can result in different lesions and symptoms at the anatomical site in question or systemically.

It refers to a literature review based on published scientific articles and clinical studies, with a preference for current concepts and data, establishing a bibliographic list on the oral and maxillofacial pathological description of the disease cancer.

As a research method, established parameters were adopted for this review, such as: articles published in Portuguese and English on the topic covered, but no date limit was established for selection. Carried out through searches in the National Library of Medicine (PubMed), Scientific Electronic Library Online (Scielo) and Latin American and Caribbean Literature in Health Sciences (LILACS) databases using the descriptors: "Antineoplastic Protocols, Cancer Symptoms, Oral Health, Oral Manifestations".

3. Results and discussion

3.1 Cancer

Cancer is a chronic disease that cannot be transmitted, although there are studies on it is hereditary potential. Worldwide, was the second leading cause of death with extensive numbers and the factors, such as smoking and alcoholism habits [9].

With the decrease in birth rates in countries, the aging of the population becomes one of the consequential factors in addition to lifestyle for the development of more cases of the disease. Late diagnosis is an aggravating factor that is related to difficulties in accessing health services and technical training to recognize these manifestations [10].

Characterized by the disordered growth of cells that can acquire a mechanism of metastasis, that is, to multiply in nearby or distant regions. Carcinomas have their establishment from epithelial tissues, such as skin and mucosa. What can differentiate from being a malignant or benign growth is the way these cells develop. In benign lesions, cell proliferation occurs in a gradual and orderly manner, while malignant lesions have rapid disorganized growth. [5,6].

Oral health is directly affected in patients diagnosed with cancer in the head and neck region, as the application of anticancer therapies leads to a series of sequelae in chewing and swallowing. [11].

3.2 Metastasis

Metastasis is a process of dissemination of cancer cells from a primary lesion that can affect regional or distant structures and is the main condition of mortality and morbidity of the disease [12, 13].

It is stated that this multiplication process is not arranged as a linear cascade, but a multiple and simultaneous procedure. Cancer cells separate from the primary tumor, pass through the circulatory and lymphatic systems, escape the immune attack, disperse into distant capillary beds so that they can invade and spread to distant organs. Metastasis can be separated into three phases, such as dissemination, dormancy and colonization. During this development, cells contribute to tissue invasion, survive immune influx and colonize nearby or distal tissues and organs. [13, 14].

This characteristic in some cases of the disease is what leads to death due to the difficulty of treatment, as it conditions an antineoplastic treatment of a systemic and evolutionary nature. It is up to multidisciplinary health care to reinforce the immune stimulus to respond to the proliferation of these cells [14].

3.3 Treatment modalities

The management of cancer patients is complex due to their debilitating conditions, currently three main therapeutic modalities are used: chemotherapy, radiotherapy and surgery. They can be approached jointly or separately, depending on each clinical case, evaluating the systemic factors that surround the patient [4].

Chemotherapy is one of the therapies that have the highest incidence of curing many neoplasms and indicating a positive prognosis. It consists of administering chemical substances that interfere with the growth and metastatic potential of neoplastic cells. The main routes used for administering these agents are intravenous, intramuscular, subcutaneous and intraarterial. It is divided into neoadjuvant chemotherapy, when it is used before surgery to assess the systemic antineoplastic response, and adjuvant chemotherapy, when it is used after the surgical procedure in order to stop metastases. [15].

The use of more than one cytotoxic agent belonging to chemotherapy acting in the delay of the disordered growth cycle of the cells and because more than one compound is used the dosages are reduced. Classified according to their pharmacological structure in: alkylating agents that act in the conformation of the cell's DNA, preventing its replication, for example cyclophosphamide, ifosfamide and cisplatin; antimetabolite agents that are incorporated into cells in the DNA synthesis phase, preventing the completion of the process of fundamental substances, such as thioguanine, methotrexate and fluorouracil; and antitumor antibiotic agents that influence the synthesis of nucleic acids becoming a barrier to the duplication

and replication of DNA and RNA chains, for example doxorubicin and daunorubicin. Due to their influence on constitutive processes, chemotherapeutic agents affect both normal and cancer cells. [15, 16].

Radiotherapy against cancer is one of the most effective methods and presents favorable indicators in improving the symptoms of the disease [17]. The use of radiation takes into account data factors such as dosage schedule and time, photon administration techniques and clinical characteristics of the tumour to be treated [18].

It is configured by the emission of ionizing electromagnetic X-rays with the objective of promoting the reduction or eradication of the development of cancer cells, but like chemotherapy, the use of this method also affects cells under normal conditions, which can lead to oral complications of acute or chronic form. The mechanism of action can be indirect, when the harmful effect of radiation occurs through the production of free radicals, or directly, when it causes cell death in the DNA structure. [3].

3.4 Oral Mucositis

The tissues that cover the entire oral cavity with the purpose of protection and lining are basically made up of two layers, epithelial, more superficially, and connective. During cancer treatment, in the radio and chemotherapy modalities, an inflammatory change occurs in these tissues with uncomfortable symptoms for the patient [3, 6].

It mainly affects non-keratinized regions, such as the buccal mucosa, soft palate, oral floor and ventrolateral surface of the tongue. The first manifestation is the whitening of the surface layer due to the absence of desquamation, consequently the reconstitution of this tissue is due to an atrophic mucosa with the presence of edema, erythema and fragmentation. An ulcerated lesion can be reached, causing pain, burning and discomfort to the patient. These lesions usually resolve within 2 to 3 weeks of completing cancer treatment. Although, for the control of painful symptoms, there is still no completely effective treatment route, the technique of cryotherapy, laser therapy, mouthwash with soda and salt and conventional methods with anesthetics, analgesics and antimicrobials are used. [6].

3.5 Xerostomia

Salivary glands are important structures for specific processes in the oral cavity, due to the production of saliva, which in turn is responsible for facilitating swallowing by salivary amylase and maltase, and especially for controlling pH in the mouth. During antineoplastic treatments, hyposalivation occurs, that is, the symptom of dry mouth that configures xerostomia. Oral dryness and burning, dry mucosa and skin, fissures in the labial commissure region, hypogeusia and difficulties in swallowing food are some of the symptoms of this manifestation [7, 19].

As a result of irradiation, these glands react by

compensatory hyperplasia to maintain their functionality and can generally be present after the first week of cancer treatment, being more associated with radiotherapy. The mucous glands may recover partially with exposure, the serosa glands are more sensitive than the anterior ones and the parotid glands, when affected, are difficult to reverse. In addition, hyposalivation by causing a deregulation of the pH in the oral cavity ends up generating a higher incidence of caries disease [6].

Substances that stimulate salivation, such as pilocarpine and cevimeline, are often used to improve the condition. Innovations are positive with the use of artificial saliva [6, 7].

3.6 Trismus

It is a condition of motor complication of the stomatognathic system, which consists of difficulty in opening the mouth in deficiency of the masticatory muscles [20].

Usually associated with the use of radiation that generates fibrosis, the situation causes difficulties in oral hygiene, dental treatment, speech and nutrition. The form of prevention and rehabilitation of this region is maintained through masticatory physiotherapy, performing the mouth opening exercise guided by a professional in the area [3, 6].

3.7 Osteoradionecrosis

It is a more debilitating complication in antineoplastic treatment and has a lower incidence due to advances in prevention research. It is configured as a destruction of bone and adjacent tissues, in addition to the reduction of important cells for development and recovery, such as osteoblasts and osteocytes [7].

The symptomatology is marked by edema and erythema in tissues, soft tissues, bone exposure in necrosis, trismus, ulcers, paraesthesia, fistula formation, cortical perforation, pathological fracture, pain and inflammatory alteration in the lymph nodes. It usually affects the mandible region more, but there are cases of this condition in the maxilla. The main associated factors are the radiation dose ratio, the proximity of the tumour to the bone region and the presence of remnants. Therefore, performing dental extractions and minor oral surgeries is not indicated if the patient has undergone radiotherapy [6, 7].

Although it is a pathology considered rare, this manifestation of radiotherapy in the head and neck region is morbid and uncomfortable. Multidisciplinary care in diagnosis and prevention is essential. To avoid this, all dental structures under analysis must be examined and the oral adaptation performed before antineoplastic therapy [6, 21].

3.8 Viral, bacterial and fungal infections

The patient undergoing chemotherapy or radiotherapy has a deficiency in the immune defense status. Given this fact, they become susceptible to some infections, such as fungal infection due to

changes resulting from therapies in the oral microbiota, promoting increased colonization by *Candida*, which manifest as white spot lesions and local or systemic antifungals are used for treatment. Bacterial infection, as the decline in salivary secretion also reduces resistance to bacterial pathogens. In these cases, it is essential to reinforce good oral hygiene. Viral infection, during antineoplastic treatment, the latent HSV virus can be reactivated in immunosuppressed patients or exposed to radiation. As for the therapeutic method, antivirals can be administered, but it is a supportive medication for the condition [7].

4. Conclusion

Prior dental evaluation is extremely important for cancer patients, even when they have not yet been diagnosed, so that they can be managed in the best possible way to the detriment of their conditions. Therefore, the presence of oral complications resulting from cancer treatment is undeniable, as it is an aggressive neoplasm that weakens the general health of individuals.

Therapeutic modalities for cancer currently have full capacity to generate serious, and even irreversible, implications in the oral structures and stomatognathic system, hence the need to recognize dentistry as an ally of the oncological area given the use of preventive treatments that reduce the effects collaterals.

5. References

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