ORAL CHANGES AFTER RADIOTHERAPY IN PATIENTS WITH HEAD AND NECK CANCER

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ABSTRACT

Cancer of the mouth begins in the oral cavity which includes: lips, jugal mucosa, teeth, gums, the first two-thirds of the tongue, floor of mouth, hard palate and retromolar trigone. Radiation therapy is a method capable of destroying tumor cells, employing a beam of ionizing radiation, seeking to eradicate all tumor cells with the least possible damage to the surrounding healthy cells at the expense of which the regenerated area will be regenerated. The objective of the present literature review was to report the main pathologies related to the performance of radiotherapy in patients with head and neck cancer. We selected articles published in the years from 1978 to 2017. The response of the tissues to radiation depends on several factors, such as the sensitivity of the tumor to radiation, its location and oxygenation, as well as the quality and quantity of radiation, in addition to the total time given. The oral complications of radiotherapy of head and neck neoplasms are common because they are rapidly renewing cells suffering greater action of the radiation agents, and can compromise the quality of life of the patient, besides negatively affecting the course of the cancer treatment until its suspension. Adverse reactions to radiation therapy are classified as acute, which occur during treatment or up to three months after the end, and late, which may manifest several months or years after the end of treatment. Oral mucositis is a clinically important and sometimes dose-limiting complication of cancer therapy. Mucositis lesions can be painful, affect nutrition and quality of life, and have a significant economic impact. Protocols for the treatment of the adverse effects of radiotherapy in the stomatognathic system are the responsibility of the dental surgeon. These include symptomatic relief, systemic medicines, physiotherapy, accumulating and oral lubricants, excellent oral hygiene and diet of certain types of food.

Key Words: Head and neck neoplasms, Radiotherapy, mouth

INTRODUCTION

Cancer of the oral cavity is part of the set of tumors that affect the head and neck [1]. An estimated 300,000 new cases worldwide in 2012, of which approximately two-thirds are male. For mortality, an estimated 145,000 cancer deaths worldwide in...
2012, with about 80% occurring in less favored regions. Ethanol consumption, smoking, and HPV infections, mainly types 16 and 18, are the main risk factors for this group of tumors. The risk of developing oral cavity cancer attributed to smoking and alcohol consumption is approximately 65%. When these two factors are together, a synergism between them is observed, causing that risk to increase even more [2].

Exposure to ultraviolet solar radiation is also an important risk factor for lip cancer. In addition to these, some genetic changes in the development of this cancer are also observed. HPV infection is associated with the development of oropharyngeal, amygdala and base of tongue cancers. Because of changes in sexual behavior, there is an increase in the incidence rates of these types of tumors among the young adult population [3]. The most common type of oral cavity cancer is squamous cell carcinoma. In general, it develops from the progression of epithelial hyperplasia to carcinoma in situ and then to invasive form. However, not all carcinomas pass through these stages [4].

Cancer of the mouth begins in the oral cavity which includes: lips, jugal mucosa, teeth, gums, the first two-thirds of the tongue, floor of mouth, hard palate and retromolar trigone. Depending on the extent and location of the tumor, there is a need for confection of obturator bucomaxillary prostheses so that the patient can eat safely and also to achieve speech intelligibility. These prostheses are necessary in the impossibility of rehabilitation through grafts and / or aesthetic reconstruction surgeries [5].

In Brazil in the year 2016, 11,140 new cases of cancer of the oral cavity in men and 4,350 in women. These values correspond to an estimated risk of 11.27 new cases per 100,000 men and 4.21 per 100,000 women. Without considering non-melanoma skin tumors, oral cavity cancer in men is the fourth most frequent in the Southeast Region (14.58 / 100 thousand). In the Northeast (6.86 / 100 thousand) and Center-West Regions, it ranks fifth (9.15 / 100 thousand). In the South Region (15.91 / 100 thousand), it occupies the sixth position, and in the North Region (3.46 / 100 thousand) is the seventh most frequent. For women, it is the ninth most frequent in the Northeast Region (4.11 / 100 thousand). In the Southeast Region (5.29 / 100 thousand), it occupies the tenth position. In the North Region (1.76 / 100 thousand) and Central West (2.79 / 100 thousand), it is the 12th most frequent, and in the South Region (3.32 / 100 thousand), it ranks 15th [6,7].

Radiation therapy (RT) is a method capable of destroying tumor cells, employing a beam of ionizing radiation, seeking to eradicate all tumor cells with the least possible damage to the surrounding healthy cells at the expense of which the regenerated area will be regenerated. Ionizing radiation is electromagnetic or corpuscular and carries energy [8]. When interacting with the tissues, fast electrons are generated that ionize the medium and create chemical effects, such as water hydrolysis and the rupture of the DNA strands. Cell death occurs through a variety of mechanisms, from the inactivation of vital systems to the cell to its inability to reproduce. The response of the tissues to radiation depends on several factors, such as the sensitivity of the tumor to radiation, its location and oxygenation, as well as the quality and quantity of radiation, in addition to the total time given [9]. In order for the biological effect to reach a greater
number of neoplastic cells and tolerance of normal tissues is respected, the total dose of radiation to be administered is usually fractionated in equal daily doses when external therapy is used [10]. The oral complications of radiotherapy of head and neck neoplasms are common because they are rapidly renewing cells (five to 14 days) suffering greater action of the radiation agents, and can compromise the quality of life of the patient, besides negatively affecting the course of the cancer treatment until its suspension [11]. Adverse reactions to radiation therapy are classified as acute, which occur during treatment or up to three months after the end, and late, which may manifest several months or years after the end of treatment [12]. Oral mucositis is a clinically important and sometimes dose-limiting complication of cancer therapy. Mucositis lesions can be painful, affect nutrition and quality of life, and have a significant economic impact [13].

Protocols for the treatment of the adverse effects of radiotherapy in the stomatognathic system are the responsibility of the dental surgeon. (Andrews, 2000). These include symptomatic relief (mucositis), systemic medicines (fungal and viral infections), physiotherapy (trismus), accumulating and oral lubricants (xerostomia), excellent oral hygiene (caries irradiation) and diet of certain types of food (dysgeusia) [14,15,16].

The objective of the present systematic review was to evaluate the oral manifestations of the treatment of head and neck neoplasia in patients treated with radiotherapy.

**METHODOLOGY**

This study had as a methodology the active search for information in the databases of the Latin American and Caribbean Center for Health Sciences Information (BIREME), MEDLINE, LILACS and BBO, as well as the SciELO virtual library.

**Discussion**

The forms of treatment of head and neck neoplasms are surgical or radiotherapeutic. The use of minimally invasive surgery, such as marginal guidewire surgery (marginal mandibulectomy), has increased in recent times, however, in the majority of cases in which this bone is involved, segmental mandibular resection with microvascular reconstruction is necessary using flaps free of fibula or other bones to restore mastication and facial contour and allow the placement of osseointegrated implants for orofacial and dental rehabilitation [3]. Squamous cell carcinoma (squamous cell carcinoma or squamous cell carcinoma) is the most frequent malignant neoplasm of the buccal region, accounting for approximately 95% of the cases diagnosed. In the early stages cancers of the oral cavity appear as firm and raised plaques, or as irregular, rough or verrucous areas of thickening of the mucosa, whitish or erythematous. With the evolution, nodules are formed with later appearance of central necrosis, forming ulcers with irregular contours, hardened and with irregular borders, usually asymptomatic [14,15].

Patients undergoing radiation therapy for the treatment of head and neck cancer tend to develop oral complications, which are reflected in the skin, mucous membranes, salivary glands and teeth [2]. The clinical manifestations most commonly found are: xerostomia, mucositis, dysgeusia, dysphagia,
muscular trismus, candidiasis, alterations in the periodontal ligament, caries of irradiation, osteoradionecrosis and their treatments are the responsibility of the dentist surgeon [1,12,15]

The conventional radiotherapy side effects are more frequent and intense compared to intensity modulated radiotherapy, such as xerostomia, dysphagia, osteoradionecrosis, but the impact of this therapy on patient survival is unknown [4,8,11]. No fractionation schedule has proven to be great for all types of head and neck cancer. Conventional fractionation consists of daily fractions of 1.8 to 2 Gy, five treatments per week. Attempts to improve treatment outcomes for head and neck cancer have led to the development of alternative times for radiotherapy delivery [16]. During the last two decades, two altered dominant fractionation schemes - hyperfraction and accelerated fractionation - were studied. The hyperfraction scheme delivers two or more small dose fractions on each day of treatment and maintains the overall treatment time equal to or slightly reduced. The use of lower dose fractions allows a higher biologically effective dose to be delivered to the tumors and increases the tolerance of late responding normal tissues. Some randomized trials have shown that the hyperfraction timing was associated with significantly greater locoregional control and survival rates than the corresponding rates of the standard fractionation scheme. Considering the normal effect of the tissue, hyperfraction is associated with more severe acute mucositis, but the incidence of delayed complications were within the range observed with conventional fractionation schemes [9].

The accelerated fractionation refers to a schedule in which the total treatment time is reduced but the number of dose fractions, the total dose and the dose size per fraction are unchanged or somewhat reduced [10]. The basic logic for accelerated fractionation is that the reduction in total treatment time decreases the opportunity for the regeneration of tumor cells during the course of treatment. Clinical research on accelerated fractionation showed that the reduction in treatment time produced a significant improvement in locoregional control and survival rates. Accelerated times caused severe acute mucositis but no detectable increase in late complications [17].

The optimal radiation dose depends on the size and location of the primary tumors and lymph nodes in the neck. In general, primary tumors and gross lymphadenopathy require a total of 70 Gy or more, with a daily fraction of 2 Gy. Radiation to nodal regions of low risk neck requires a total of 50 Gy or more. For postoperative radiotherapy, higher doses of radiation (60 to 66 Gy) are generally required for microscopic disease to decrease the risk of locoregional failure resulting from disruption of normal vasculature, healing, and relative postoperative tumor hypoxia [9,16,17].

The prevention of adverse effects should have: excellent oral hygiene, daily application of topical fluoride, either as a mouthwash, neutral gel of 1% sodium fluoride with the aid of individual trays or toothpastes with 5000 ppm, open mouth exercises 20 times in a row, three times a day. In cases of mucositis: evaluate the degree of inflammation: 0: absent; 01: discolouration, whitish appearance, allowing normal diet; 02: erythema, normal diet; 03: pseudo-membrane, liquid diet; 04: deep ulceration,
impossibility of oral feeding. And the treatment should include: high control of oral hygiene, avoiding foods that are too spicy, acidic and of solid consistency and use of alcohol and tobacco, it is not advisable to use prostheses. Mouthwashes of benzidamine or lidocaine hydrochloride 100 mg, saline 0.9%, aluminum or magnesium hydroxide, non-acid taste four times a day, application of 2% viscous xylcaine in affected areas, cetoprofen 150mg twice daily 8 / 8h, laser therapy, cryotherapy, aloe and vera gel, honey based products [3,15]. The use of chlorhexidine is not recommended for management of mucositis, but may have value as a broad spectrum antiseptic to control microbial risk of dental and gingival disease and has limited antifungal activity. If used in patients with oral mucositis formulations without alcohol are needed [18].

In cases of fungal infections: the most common is candidiasis, which presents in the pseudomembranous, erythematous, hyperplastic and angular cheilitis forms. Because there are controversies regarding topical medication, use only the systemic: fluconazole 100 mg / day or ketoconazole 200 mg / day for seven days. For cases of viral infections: the most common is the herpes simplex virus - HSV, its treatment is given with the use of acyclovir [4,6].

In cases of xerostomia: symptomatic treatment with citric acid, artificial saliva, sialogogos (pilocarpine 5 mg: contraindicated for heart patients, patients with arterial hypertension, asthma and gastrointestinal ulcers), aminophosphine, accumulation, oral lubricants, repeated mouthwashes with bicarbonated water and tea of chamomile, adequate nutrition and hydration, avoid use of cigarettes and alcohol [9,14].

It should be avoided by performing the necessary exodontia before the radiotherapy treatment. If the procedure is unavoidable after radiotherapy, make use of antibiotic prophylaxis and vitamin E vitamin supplement. There are discrepancies in the use of hyperbaric oxygenation, and further studies are required. The pretreatment dental management should be directed at necessary assessment including complete oral, dental, and periodontal examination and baseline range of jaw movement and saliva production. The baseline measures allow evaluation of changes that may occur following treatment and indicate potential need for intervention. Standard preventive oral care should be provided. Acute oral complications may be more easily recognized than the ongoing issues common in survivors, but both represent a challenge to the oncology team [19].

CONCLUSION

Further intensive research through well-structured clinical trials to obtain the best scientific evidence over the standard therapy of patients whit oral cancer is necessary to attain ideal parameters for radiotherapy and chemotherapy and oral health.

REFERENCES


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