

Osteoradionecrosis: case report

Osteorradionecrose: relato de caso

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ABSTRACT

Patients undergoing radiotherapy alone or as part of the treatment of head and neck cancer are likely to develop osteoradionecrosis (ORN). Dental extractions have been inferred as the main triggering factor of ORN, particularly in mandibular molars. The osteoradionecrosis has been reported in up to 20% of irradiated patients undergoing dental extraction and is recognized as the most severe complication of radiotherapy in the mandible, causing great discomfort and loss of quality of life of patients. The risk of ORN development is related to the dose, technique, and volume of irradiated tissue, and other predisposing factors such as: extraction at peri-radiotherapy period, site of extraction, pre-existing periodontal disease, general trauma, poor oral hygiene, nutritional deficiency, alcohol and smoking, and systemic diseases. The cellular injury and hypoxia caused by decreased blood supply reduce the recoverability of soft tissue and bone, predisposing them to necrosis and osteonecrosis, even spontaneous. Clinical management of osteoradionecrosis is complex and depending on the degree of involvement, it may require analgesics and antibiotics in addition to the adoption of surgical procedures, aiming to eliminate pain, control infection, and prevent or reduce the progression of the lesion. This paper aimed to report a case of osteoradionecrosis treated in the multidisciplinary clinic of the Onco Project - ICT/UNESP (São José dos Campos/SP, Brazil). A female patient aged 65 years with osteoradionecrosis and fistula after radiotherapy of squamous cell carcinoma in gingiva was submitted to tooth extraction, antibiotic therapy and local care with good response and flow interruption through the fistula. During the treatment, the carcinoma relapsed and the patient was referred for oncologic treatment.

KEYWORDS

Dentistry; Osteoradionecrosis; Radiotherapy.

RESUMO

Pacientes submetidos à radioterapia como parte do tratamento do câncer de cabeça e pescoço estão sujeitos a desenvolver osteorradionecrose (ORN). As exodontias têm sido implicadas como principal fator desencadeador de ORN, particularmente em região de molares inferiores. A osteorradionecrose tem sido reportada em até 20% dos pacientes irradiados submetidos à exodontia, e é reconhecida como a mais severa complicação da radioterapia em mandíbula, acarretando grande desconforto e perda na qualidade de vida do paciente. O risco de desenvolvimento de ORN é relacionado à dose, técnica e volume de tecido irradiado, e outros fatores predisponentes como: exodontia no período peri-radioterapia, local de extração, doença periodontal preexistente, trauma causado por próteses mal adaptadas, higiene oral deficiente, deficiência nutricional, uso de álcool e fumo, e doenças sistêmicas. A injúria celular e hipóxia causadas por redução do suprimento vascular, reduzem a capacidade de recuperação dos tecidos moles e do osso, predispondo-os a necrose e osteonecrose inclusive espontânea. O manejo clínico da osteorradionecrose, é complexo e dependendo do grau de acometimento pode requerer além de uso de analgésicos e antibioticoterapia a adoção de procedimentos cirúrgicos, tendo como objetivo eliminar a dor, controlar a infecção e evitar ou reduzir a progressão da lesão. O objetivo deste trabalho é relatar um caso de osteorradionecrose atendido na clínica multidisciplinar do Projeto Onco – ICT/UNESP São José dos Campos.

PALAVRAS-CHAVE

Odontologia; Osteorradionecrose; Radioterapia.

INTRODUCTION

The osteoradionecrosis (ORN) is defined as the exposure of bone tissue irradiated on one or more areas of the mandible or maxilla, which does not heal for more than three months without signs of residual disease or relapse. It may develop in one third of patients irradiated on the head and neck, but usually manifests after tooth extractions, oral surgery or due to irritation caused by maladapted dentures [1].

Several theories have been proposed to explain the pathophysiology of osteoradionecrosis, the latest one proposes ORN occurs due to a radiation-induced fibro-atrophic mechanism, which includes the formation of free radicals, endothelial dysfunction, inflammation, microvascular thrombosis, fibrosis, remodeling, and finally necrosis of bone and soft tissues [2].

Clinical signs include pain, swelling, erythema of soft tissue, necrotic bone exposure, trismus, ulceration, cervical lymphadenopathy, bone sequestration, paresthesia, fistula, and pathological fracture. The risk of ORN development is related to the dose, technique (external or brachytherapy) and volume of irradiated tissue, location, and histological tumor grade. Other predisposing factors include pre-existing cavities and periodontal disease, tooth extraction at the post-radiation period, general trauma, poor oral hygiene, nutritional deficiency, site of extraction, use of alcohol and tobacco, and systemic diseases such as diabetes. The risk increases with the number of coexistent risk factors [2,3]

The extractions immediately before or after radiotherapy are seen as the main trigger factor of osteoradionecrosis and may have an impact ranging from 2-18% and the spontaneous occurrence in the absence of traumatic event is reported in 35% of cases [4,5].

Clinical management of osteoradionecrosis includes the use of local or systemic antibiotics, pain control, and surgery in severe cases [7].

Additional therapies have been recommended as the use hyperbaric oxygen therapy and ultrasound, and drugs that increase blood perfusion as pentoxifylline, vitamin E, and clodronate [6-8].

CASE REPORT

The patient was treated in May 2012, at the multidisciplinary clinic (Onco- Project ICT/ UNESP): female, leucoderm, aged 65 years, and former smoker. In 2009, she was diagnosed with squamous cell carcinoma in gingiva of the right mandibular alveolar ridge with histopathological grade II. She underwent surgery to remove the lesion, associated with radiotherapy on the site at a dose of 6000 cGy, and lymphatic drainage chains. After six months, in 2010, she showed spontaneous osteoradionecrosis, having undergone sequestrectomy in the region with good results. The patient had no signs of local infection processes until April 2012, when she was treated at private dental practice presenting pain in the mandibular right first molar (46), which was extracted without the adoption of antibiotic prophylaxis. After the surgery, she had cutaneous fistula with purulent drainage originating in the mandibular bone.

The patient was treated at the multidisciplinary clinic Onco Project, with main complaint of discomfort and severe pain, lack of adaption of maxillary total denture preventing the use, and trauma in the maxillary edentulous alveolar ridge caused by shifting of the mandibular remaining teeth, purulent drainage through the orocutaneous fistula.

At the extra-oral examination, the patient showed mandibular deviation to the right and orocutaneous fistula with purulent exudate drainage and intense granulation tissue (Figures 1 and 2). At the intraoral examination, poor oral hygiene, periodontal mobility of teeth 31, 32, 33, 41, and 42, hyposalivation, trismus, and tightening of the right submandibular gland were seen.



Figure 1 - Mandibular shift to left.



Figure 2 - Extraoral view of the fistula.

The panoramic radiograph exhibited great bone loss and mandibular deviation to the right, and periodontal involvement of the remaining teeth (Figure 3). After evaluation of the case, we opted for the extraction of the remaining teeth in order to reduce injury to the mucosa of the maxillary alveolar ridge during occlusion, and eliminate infectious foci of periodontal disease. To the oral environment adequacy, it was prescribed oral ciprofloxacin 500 mg every 12 h for 7 days before and after dental extractions.

The postoperative evolution was excellent, with a greater reduction of purulent secretion and inflammatory signs which allowed observe a tissue proliferation with characteristics different from those of inflammatory tissue, leading to the hypothesis of neoplastic recurrence (Figure 4). Incision biopsy of soft tissue site was performed and the result of anatomical pathology indicated squamous cell carcinoma and the patient was properly referred to cancer treatment.



Figure 3 - Panoramic radiograph.



Figure 4 - Intraoral aspect after surgery.

DISCUSSION

The patient had ORN spontaneously in the first 6 months after radiotherapy and received a total dose of 6000 cGy in the irradiated site. Marx, in 1983, stated that 35% of patients have osteoradionecrosis without the prior occurrence of local trauma and this is related to high dose of radiation received [5]. Kanatas et al., in 2002, affirmed that patients who receive higher radiation doses than 60 Gray are at increased risk of developing injury [9]. Lyons, in 2012, suggests that a genetic component may exist in the development of ORN which could explain its development in the absence of trauma [12].

The second occurrence in the same patient took place after the extraction in the irradiated site, and according to the literature, it is estimated that ORN incidence after tooth extractions in irradiated patients is around 2-18% [4]. According to Nabil, in 2011, antibiotic prophylaxis before dental extraction is the most common initiative adopted for prevention of ORN, which is in accordance with the procedure performed in this present case report, other precautions include trans-operative care as minimally traumatic technique and alveoloplasty. The result obtained in this case report corroborates the study of Chrcanovic, in 2010, who demonstrated the highest incidence of ORN in the mandible, three times greater than in the maxilla, has been attributed to low blood supply, the more compact bone structure, and the fact that the mandible is involved in the irradiation site of the main oral tumors: tongue, retromolar region, and oral floor, as well as their involvement in the surgical treatment of the injuries [2].

Considering the major advances in the treatment of head and neck cancer and the regular use of radiotherapy as part of the protocol, the knowledge of osteoradionecrosis by dentists and oncology team is of paramount importance. We agree with most of the authors mentioned in this paper when they argue that prevention seems

to be the key point in the management of the disease, and the patient should receive adequacy of oral environment preferably before the start of radiotherapy: the extractions on the site to be irradiated must preferably be conducted up to three weeks before radiotherapy, teeth severely impaired by caries or periodontal disease should be extracted, the care with oral hygiene should be intensified. Prophylactic antibiotic therapy should be incorporated into the protocol in any oral treatment to be performed in irradiated patients. The use of prostheses is contraindicated in the first year after radiotherapy and should be monitored regularly, since the risk of developing the disease is permanent [2,4,9,10].

The dentist has a fundamental role in the prevention and management of disease and should be able to recognize patients at risk of developing ORN and the preventive tools to be used.

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