

# Effect of bisphosphonates on the anterior region of the mandible in a patient. A proposal of a clinical case

## Summary

Bisphosphonate-induced osteonecrosis of the jaw is a severe complication that can occur in patients treated with these drugs, especially after oral surgical procedures. We present the case of a 79-year-old male patient who came to the clinic with pain and increased volume in the mandibular region. Despite initially denying relevant medical history, it was revealed that he had been on treatment with zoledronic acid for several years due to prostate carcinoma. After a surgical intervention to remove necrotic tissue, the patient developed osteonecrosis of the jaw, which complicated the healing and recovery process.

Volume 11 Issue 6 - 2024

Julio César Chi Rivas,<sup>1</sup> Lucia María Escobedo Batista<sup>2</sup>

<sup>1</sup>General Dentist, Medical Science University, Cuba

<sup>2</sup>Lucia María Escobedo Batista. I Grade Specialist in General Dentist, I Grade Specialist in Maxillofacial Surgery, Medical Science University, Cuba

**Correspondence:** Julio César Chi Rivas, General Dentist, Medical Science University, Cuba, Email juliochirivas@gmail.com

**Received:** September 26, 2024 | **Published:** November 13, 2024

## Introduction

Bisphosphonates are synthetic analogues of the endogenous pyrophosphate molecule. They regulate bone metabolism by binding to hydroxyapatite in the mineralized matrix and remain in the skeleton for a long time, exerting their antiresorptive activity.<sup>1</sup>

They are medications used to prevent the loss of bone mass, care for malignant bone diseases that involve bone (multiple myeloma, hypercalcemia), bone metastasis from cancer (prostate, breast, lung and kidney) and non-malignant bone diseases (osteoporosis, Paget).<sup>2</sup>

They have been widely used in the treatment and prevention of osteoporosis. In the field of oncology, bisphosphonates are used in the treatment of tumor hypercalcemia, in the prevention and treatment of bone events associated with bone metastasis and in the prevention of osteoporosis associated with breast cancer.<sup>1</sup>

These medications have many benefits but also have adverse effects in the oral cavity such as osteonecrosis of the jaw (ONJ), which causes bone death in the affected or treated area, frequently caused after treatments that involve manipulation of the mandibular or maxillary bone such as extractions, dental surgeries, implant placement, periodontal surgeries or maxillofacial surgeries.<sup>2</sup>

This is a bone injury secondary to bone ischemia. The pathogenesis of ONJ is unknown, but it appears to be based on the action of bisphosphonates on Ca/P metabolism and osteoblasts, which indirectly inhibit bone neoangiogenesis and damage the endothelium of small vessels.

ONJ due to bisphosphonates usually appears between 4 months and 6 years after starting treatment with bisphosphonates. While when administered intravenously the exposure time is less than one year: 9.3 months for zoledronic acid and 14.1 for pamidronic acid. Lesions develop more frequently in areas where surgery or any invasive procedure has been performed.<sup>1</sup>

Intravenous antiresorptives tend to be more aggressive, since they have a level of toxicity that prevents proper healing of the epithelial

tissue, causing the bone to remain uncovered. Osteonecrosis of the jaws, being a complex disease, also involves: alteration of wound healing, formation of oral biofilm, infection and inflammation, suppression of the angiogenesis process, also, in advanced stages it can evolve towards the formation of extraoral fistulas and intraoral, bone sequestration, secondary paresthesia, pathological fracture, oronasal communications, abscesses, phlegmons, sinusitis, loss of sensitivity of the ipsilateral lower lip, lockjaw and fever. The patient may experience a sensation of numbness, heaviness or dyspnea of the jaw, as well as dental mobility.<sup>3</sup>

## Objectives

To describe the development and treatment of osteonecrosis of the jaw in a patient treated with bisphosphonates through a clinical case.

## Case Report

### General Information

A 79-year-old male patient with a medical history is presented, who came to our care service without prior referral due to spontaneous pain in the jaw.

### Pathological History

The patient came to the clinic due to pain and increased volume in the mandibular region. Both he and his companion stated in consultation that the patient did not have any underlying pathology and had not received any type of treatment. It was decided to perform complementary blood chemistry and radiographic tests for better evaluation.

### Clinical Manifestations

Extraorally, an increase in volume was observed in the bilateral submandibular and mental regions that extended to the region of the body of the mandible equally on both sides.

Intraorally, there were purulent secretions in the mandibular region from the anterior sector to the premolar region.

## Complementary Exams

### Blood

Hemoglobin: 158 g/L Leukocytes: 10.8 x 10<sup>9</sup>/L

Hematocrit: 51% Segmented: 072

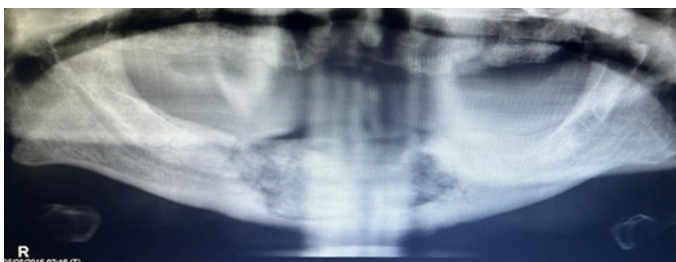
Blood group and Rh factor: B+ Eosinophils: 007

Coagulation T: 8min Monocytes: 000

Lymphocytes: 032 Platelet count: 316x10<sup>9</sup>/L

### X-ray

A panoramic radiograph was indicated where a radio-lucent area was observed in the anterior sector of the mandible compatible with bone destruction and bone sequestration that ranged from the aforementioned area to the premolar region in the middle portion of the mandible. (Figure 1)



**Figure 1** Panoramic view showing radiolucent area in the anterior sector of the mandible.

### Management and treatment

Once the patient has been evaluated through the physical examination and complementary blood chemistry and X-ray studies, it is decided to perform surgical intervention in the damaged area to eliminate the bone sequestration, maintaining a margin of healthy bone once the damaged portion is removed. We proceed to the correct abundant washing of the area as well as curettage and suturing of the wound with 2/0 silk. Postoperative care is indicated and the patient is scheduled for suture removal.

When the patient was re-evaluated to remove surgical stitches, it was observed that the area was in a state of sepsis and there was no healing. Concerned, the patient was questioned to find out what could have happened and the patient reported that approximately 20 years ago he was being treated with bisphosphonate (zoledronic acid) for prostate adenocarcinoma.

The corresponding prophylactic measures are taken immediately with washing with antiseptic solutions (0.12% chlorhexidine) and local dressings eliminating necrotic remains 3 times a week; in addition to doses of oral antibiotics (amoxicillin with clavulanic acid, 875/125 mg every 12 hours). Schostacovsky balm was also indicated to help promote the purification, regeneration and epithelialization of wounds.

### Patient follow-up

The patient is under care and evolution at this time, with periodic evaluations and treatments. Relative improvement has been seen in terms of his oral-facial condition with the curative treatment carried out that has kept him stable. Preventively, it was decided to prescribe a course of antibiotics on a quarterly basis to avoid future complications because the patient has had super infections (which have gradually decreased over time) with the appearance of fistulas

in the submandibular regions. He is currently undergoing evaluations and treatment in coordination with the Oncology department.

Despite the above, the patient reports having improved his quality of life once he was evaluated and treated by our service.

## Discussion

Osteonecrosis of the jaw is a very current problem and a complication associated with dental treatments and certain risk factors that has been studied for many years, and currently has a wide base of scientific publications referring to the subject.

Osteonecrosis of the jaw is a common adverse effect resulting from bisphosphonate therapy. It is recognized as a major dental pathology with recent and significant impact.<sup>4</sup>

It is recommended that those patients who are going to undergo treatments with intravenous bisphosphonates should go to the dentist to

- Detect possible sources of existing or potential infection and eliminate them before treatment.
- Assess the periodontal status through radiological study, probing and gingival bleeding. In those support losses greater than 4 mm, extraction is recommended.
- Eliminate irritating factors such as those caused by removable prostheses, to avoid mucosal ulcerations. Evaluate the prominent mandibular and maxillary tori as they are covered with a thin mucosa and encourage ulcerations with friction.<sup>5</sup>

In studies carried out with different types of bisphosphonates, an incidence of 77% of affected patients was observed who were being treated with zoledronic acid, demonstrating its high rate of involvement.<sup>6</sup> Coinciding with what is represented in this case.

Although the use of bisphosphonates is of great importance for the treatment of multiple bone diseases; However, it should not be omitted that it has toxic effects on the oral cavity, so all patients must keep it in mind and communicate it to the doctor when receiving dental and/or surgical care in order to prevent all the factors that may cause osteonecrosis of the jaw.

It should be noted that the patient provided his informed consent for the data provided at work such as his complementary examinations (x-rays and laboratory tests) and personal data for the clinical case.

## Conclusions

This case highlights the importance of clear communication between the patient and the health team. The omission of bisphosphonate treatment in the patient's medical history was a determining factor in the development of osteonecrosis of the jaw after surgery. Bisphosphonates, used to treat conditions such as osteoporosis and certain bone pathologies, inhibit bone resorption and, as a side effect, can interfere with bone healing, especially after invasive procedures in the maxillofacial area. This case highlights the need to educate patients about the importance of communicating all treatments they receive.

## Acknowledgements

None

## Conflict of interest

The authors declare no competing interests.

## References

1. Vidal MA, Medina C, Torres LM. Safety of bisphosphonates. *Revista de la Sociedad Española del Dolor*. 2011;18(1), 43–55.
2. Bejar CR, Félix VMC. Clinical protocol for patients with history of use of bisphosphonates. *Revista ADM*. 2017;74(5):252–260.
3. Jaqueline MG. *Consideraciones sobre el tratamiento odontológico quirúrgico de pacientes en terapia con bifosfonatos* (Bachelor's thesis, Universidad Nacional de Chimborazo). 2021.
4. Ortenzi C. Necrosis mandibular asociada al tratamiento con bifosfonatos: mecanismos implicados, factores de riesgo y medidas de prevención. 2021.
5. Miele Reyes NV. Osteonecrosis de los maxilares inducidos por bifosfonatos. (Tesis de Pregrado). Universidad Laica Eloy Alfaro de Manabí, Manta, Ecuador. Obtenido de. 2023.
6. Teuber C, Foncea C, Rojas F, et al. Prevalence of medication-related osteonecrosis of the jaws in patients treated with intravenous bisphosphonates: an epidemiologic analysis at Centro del Cáncer – Red de Salud UC–CHRISTUS. *Revista de otorrinolaringología y cirugía de cabeza y cuello*. 2020;80(4):469–476.