Implications of the use of bisphosphonates in Endodontics

Maria Alice Diniz Pereira,1 José Leonardo Barbosa Melgaço-Costa2,3,4

1Graduate Program in Endodontics, Sete Lagoas University (FACSETE), Sete Lagoas, MG, Brazil
2Department of Endodontics, School of Dentistry, Sete Lagoas University (FACSETE), Sete Lagoas, MG, Brazil
3Department of Endodontics, School of Dentistry, Faculdade de Estudos Administrativos de Minas Gerais (FEAD), Belo Horizonte, MG, Brazil
4Dental surgeon of the Military Police of Minas Gerais, Belo Horizonte, MG, Brazil

Dear editor,

This is a brief review about the implication of the use of bisphosphonates in Endodontics. Bisphosphonates are drugs that inhibit osteoclastic bone resorption and prevent the proliferation of tumor cells and angiogenesis. These drugs are used in the treatment of diseases with excessive bone resorption, such as postmenopausal osteoporosis and Paget’s disease, and in cases of malignant hypercalcemia or osteolytic bone metastases, common in breast, lung or prostate cancer.1,2

These drugs may lead to the development of Bisphosphonate-related osteonecrosis of the jaw (BRONJ).3 BRONJ is defined by the American Association of Oral & Maxillo Facial Surgeons4 as: the persistence of exposed bone in the oral cavity in spite of appropriate treatment, for eight weeks, without local evidence of malignancy and no prior radiotherapy on the affected region, in patients who were treated with Bisphosphonates.

BRONJ is more common in women and affects the mandible (65%) more than the maxilla (26%) and may involve both arches (9%). It occurs spontaneously in 40% of cases and the bilateral involvement is more common in the maxilla.1 Its incidence in patients who use intravenous Bisphosphonates is 0.8-12%; cancer patients are the major risk group.3

Clinically, intraoral lesions are characterized by exposed areas of petrous bone, yellowish and having smooth or ragged edges.5 The lesion is painless in one third of the cases and some patients have reported swelling and abscess formation.4 Radiographically, it appears as a radiolucent image and can be mistakenly diagnosed as a cyst or a periapical lesion.6 Due to having similar signs and symptoms to endodontic infections, BRONJ may have a late or incorrect diagnosis, thus making a complete anamnesis fundamental. Histologically, it presents necrotic bone fragments, bone sequestration, the presence of inflammatory cells and abundant bacterial colonies.7

Bisphosphonates have high affinity to hydroxyapatite, which explains its long retention time in bone tissue, for ten years or more. Such information is valuable and must be considered during the dental treatment planning.8

The patient who will start therapy using Bisphosphonates must undergo a complete oral evaluation. Root remains and nonrestorable teeth must be extracted, including those with mobility, furcation involvement and large periapical lesions, as well as impacted third molars and those associated to odontogenic cysts.9 The appropriate care during oral surgery must be taken and first intention healing is extremely important,9 since the risk of getting BRONJ is seven times higher for patients who undergo oral surgeries.4

After starting the Bisphosphonates therapy, the patients must be monitored every six months to avoid the appearance of diseases or to identify the necrosis in its early stage.9 In patients with higher risk of developing BRONJ, i.e., those who used intravenous Bisphosphonates for over three years, dentoalveolar surgery must be avoided.10 When possible, the endodontic treatment is preferable, because the risk of developing BRONJ after such treatment was associated in 0.8%.11 Considered as the preferred alternative to extraction, endodontics must be performed with caution, avoiding over instrumentation and the extrusion of microorganisms to periapical tissues.

In apical periodontitis, bone loss is reduced by the use of Bisphosphonates,12 but it is an inflammatory defense process of the body when facing the infection, and the use of these drugs may harm this defense mechanism, causing the endodontic infection to progress beyond the periapical region.13

Regarding the healing process of periapical tissues after the endodontic treatment, the evidence shows that Bisphosphonates do not interfere in this process. The association between the use of Bisphosphonates and the outcome of the endodontic treatment4 from the analysis of bone remodeling, which is a critical component in the development and healing of periapical lesions, showed that the overall healing rate was lower (73.5%) for the Bisphosphonate group when compared to the control group (81.6%) and the initial treatment was more successful (81.4%) than retreatments (61.5%).15
In traumatized teeth, bisphosphonates can be beneficial in preventing root resorption after the replantation of avulsion tooth. A systematic review, analyzing the anti-reabsorption effect of Bisphosphonates on teeth that underwent avulsion and replantation, showed that the Bisphosphonate applied on the avulsion surface of the root stopped root resorption and failed to trigger BRONJ pictures.

The effect of intracanal Bisphosphonates to inhibit bone resorption in avulsion incisors, when compared to the calcium hydroxide medication, had a significantly worse outcome, probably due to Bisphosphonate’s difficulty of spreading over the dentinal tubules.17

Suspending the treatment with anti-reabsorptive agents, prior to dental treatment, is defended by some researchers but it is not widely accepted; it does not eliminate the risk of developing BRONJ due to the prolonged retention of the drug on the bone tissue.18

Given the lack of evidence about effective measures to treat BRONJ, prevention is still the best option. Evidence shows that, in addition to not being identified as a risk factor for BRONJ, the endodontic treatment is not influenced by the use of Bisphosphonates. However, the professional must prevent damage to the periodontal tissues during treatment, having caution during pre-, trans- and postoperative stages.

References