

Histologic evaluation of bone tissue affected by bisphosphonates related osteonecrosis of the jaws

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Introduction. Bisphosphonates are medications widely used in the management of osteoporosis, Paget's disease and cancer affecting the bone. They are taken up in the skeleton at sites with increased bone remodeling. Bisphosphonates treatment rapidly decreases bone resorption and progressively decreases bone formation by inhibiting osteoclastic activity in the first place and consequently affecting osteoclastic induced osteoblastic activity. Bone turnover is therefore suppressed. Angiogenesis is reduced and keratinocytes are inhibited. A complication observed following treatment with bisphosphonates is osteonecrosis of the jaws.

The aim of this study was to characterize the histological features of bone tissue obtained by patients affected by bisphosphonates related osteonecrosis of the jaws.

Material and methods. Ten bone tissue samples were obtained from 8 oncologic patients and 2 patients with osteoporosis. After surgical procedure the samples were immediately placed in formalin and processed for ground sections according to Donath and Breuner¹. Briefly, the specimens were dehydrated by increasing ethanol concentrations and embedded in Kulzer Technovit 7200 VLC® resin. The cores were cut longitudinally in two mid-sections. All slices were subsequently reduced by microgrinding and polishing to an even thickness of 80 µm. The sections were stained with Toluidine blue/Pyronine G, observed using a light microscope and photographed. On the pictures at the total magnification of 100x, the perimeter of mineralized tissue presenting resorption lacunae was measured using a dedicated software, and expressed as a percentage of the total bone tissue perimeter (RP%). Mean and standard deviation of RP% were computed from 20 histologic sections.

Results. Different histomorphological features were detected between samples, but no apparent differences were found between osteoporotic and oncologic specimens. Some areas were rich in lacunae filled with viable cells, while other areas presented empty osteocytic lacunae; some spots showed hypercellularity. In all specimens the mineralized tissue border appeared very irregular and was characterized by frequent resorption lacunae (RP: mean 92.5%±2.1). Also, bacteria and infiltrated inflammatory cells with chronic appearance were observed in all samples. The connective matrix seemed to have lost its physiologic structure.

Conclusion. it seems that osteonecrotic lesions had typical features such as bone resorption lacunae, bacteria and inflammatory cell infiltrated.

1. Donath, K., Breuner, G. 1982. J. Oral Pathol. 11: 318-326.

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