

Scanning electron microscopy study on mandibular human bone and immunofluorescence study on oral mucosa in patients treated with bisphosphonates

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Bisphosphonates are stable analogues of pyrophosphate with a P-C-P structure and 2 side chains attached to the carbon atom. Intravenous bisphosphonates are primarily used and effective in the management of cancer-related conditions in the context of solid tumors, such as breast cancer, prostate cancer, and lung cancer. Moreover bisphosphonates are subministrated to patients with metabolic bone diseases such as osteoporosis and Paget disease. Bisphosphonate-associated osteonecrosis of the jaws (BONJ) is a really complication of intravenous bisphosphonate therapy in patients with cancer. It is common knowledge that the jaws have a greater blood supply than other bones and a faster bone turnover rate, related both to their daily activity and presence of teeth which mandates daily bone remodeling around the periodontal ligament; moreover bisphosphonates toxicity to epithelial cells has been well documented. On this basis, the aim of this study is to evaluate the pathological changes of the mandibular bone and oral mucosa in patients treated with bisphosphonates, during osteoporosis treatment and during chemotherapy from solid cancer. In details we have analyzed, by immunohistochemical and scanning electron microscopic methods, intrasurgical biopsy of mandibular bone and of gingival mucosa in patients treated with bisphosphonates both intravenous and oral via after 24 and 36 months from assumption of drugs. Our results show in all patients great area demineralization bone mixed to normal bone, moreover in the demineralization bone it's possible to observe numerous micro lacunae. In the correspondence samples of gingival epithelium we observe important lesions of histological structure and the disappearance of protein adhesion system cells to cells and cells to matrix. On this basis it is intriguing to speculate that the adverse effects of BP on oral epithelium may play a critical role in the initiation of BONJ an "outside-in" hypothesis.

References

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