Endodontic Treatment of a Patient on Intravenous Bisphosphonate Therapy

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Initial Presentation

A 74 year old male with a four year history of IV bisphosphonate (Aredia) therapy for multiple myeloma presented to the Graduate Endodontic Clinic due to the risk of Bisphosphonate Related Osteonecrosis of the Jaws (BRONJ). I.U. Oral Surgery and Graduate Prosthodontics requested root canal therapy of several compromised teeth. Initial examination revealed several missing teeth (1-5, 9, 15-20 and 32) with gross decay and coronal fractures present on most of the remaining dentition (Fig. 1). Teeth numbers 13, 28 and 30 had previous root canal therapy. Teeth 9’s 12 and 14 presented as root tips with ulcerated, periodontal hyperplasic gingival tissue noted. The patient had no complaint of overt pain, however tooth #30 was percussion sensitive. The mucosa appeared dry, with no pooled saliva noted during examination.

Treatment planning

Primary root canal therapy or retreatment was planned for the maxillary complete over-denture. Maxillary teeth were to be decoronated and sealed with glass ionomer prior to fabrication of a maxillary overdenture. Treatment planning of the mandibular dentition included retreatment of tooth #30 and fabrication of a removable partial denture. Root canal therapy for the remaining dentition would be completed in the event of pulpal exposure.

Treatment

Root canal therapy was initiated with the primary focus of eliminating existing infection prior to prosthetic restoration. Over the course of 7 months and 10 appointments, root canal therapy and decoronation procedures were completed on a total of 13 teeth including a retreatment and perforation repair of tooth #30 (Fig. 2). In all cases, whether root tips or intact dentition, standard treatment protocols for orthograde root canal therapy was adhered to and included: rubber dam isolation; copious irrigation with 6% Sodium Hypochlorite (Chorox, USA), 0.12% Chlorhexidine (JM, Germany), and 17% EDTA (Vista, USA); hand and rotary instrumentation; and sealed Resilon (Penton, USA) obturation. A post-space, per Graduate Prosthodontics request, was completed prior to coronal seal with Photac Fil (3M, Germany) in all cases. Care was taken to limit instrumentation and obturation within the canal to avoid unnecessary stimulation or trauma to the periodontium; thus, limiting the possibility of subsequent complication consistent with BRONJ. Due to decay and unrestorability, mandibular teeth were decoronated and a removable partial over-denture was fabricated.

Follow-up

In each subsequent appointment, all previously completed root canals were assessed clinically and radiographically for signs of healing and development of periapical pathosis. Periapical sclerotic bone was noted on the distal root of #30 with 6 weeks of completion of root canal therapy. Tooth #30 remained mildly symptomatic with improving periapical status and eventual resolution of all symptoms within 4 months post-operatively. No other significant complications in regards to osseous healing were noted. On March 5, 2009 an upper complete overdenture and lower RPD were delivered. As of March 26, 2009 the patient is functioning without pain.

Introduction

Intravenous second generation aminobisphosphonates (i.e. Aredia) are increasingly considered in the effective treatment and management of cancer-related conditions. These conditions include, but are not limited to the hypercalcemia associated with malignancy, osseous-related pathosis associated with metastatic disease in the context of solid tumors, prostate and lung cancer, as well as the management of lytic osseous lesions commonly seen in multiple myeloma, chordroblastoma and osteoblastoma. Bisphosphonates have also been shown to be effective in reducing current hypercalcemia and stabilizing bony pathosis and preventing pathological fractures. Bisphosphonate therapy has limited improvement on the overall survival rates for the patients being treated. The greatest impact is seen in the vast improvement for the quality of life of those taking bisphosphonates.1,2,4 Disruption of the physiological repair mechanisms of osseous tissue due to bisphosphonate therapy can lead to necrotic bone formation in response to bony injury. This condition known as Bisphosphonate-Related Osteonecrosis of the Jaw (BRONJ) adversely affects the quality of life and produces significant morbidity in afflicted patients. The condition is often seen following extraction, implant placement, periapical surgery and periodontal surgery involving osseous injury.

Pathogenesis

Bisphosphonate medications are known to inhibit osteoclasts and possibly interfere with angiogenesis, precisely the reasons why they are indicated in some cancer treatments.2 Unfortunately, these mechanisms are also the reason for the development of BRONJ. Normally there exists a delicate balance between osteoblasts and osteoclasts in remodeling normal bone and repairing microfractures. However, if osteoclastic function declines, as with patients on bisphosphonates, the lifespan of afflicted osteocyes are diminished, creating vulnerable bone. Moreover, one of the highest natural rates of active remodeling occurs in the jaw allowing for incorporation of very high levels of bisphosphonates.

Clinical Presentation

BRONJ is often characterized by jaw pain, exposed bone, irregular soft tissue, swelling, loosening of teeth and persistent infection with or without purulence (Fig. 3). These symptoms are often due to secondary infection of necrotic bone, not the pathologic bone itself.

Incidence

Current estimates indicate the prevalence of BRONJ is 6-10% in patients taking bisphosphonates.

References

