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Case Report

Surgical intervention of osteonecrosis of the jaws associated with bisphosphonate therapy: Report of two cases

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ABSTRACT

We report herein two cases of bisphosphonate (BP)-related osteonecrosis of the jaws (BRONJ). Case 1 involved a 72-year-old man diagnosed with osteoporosis who was referred to our clinic for evaluation of swelling of the right mandibular gingiva. Clinical examination revealed a fistulous tract with pus discharge that had developed after extraction of the right mandibular first molar by his dentist. Clinical diagnosis was an infectious bone lesion associated with BP therapy. Risedronate sodium hydrate was administered orally at 2.5 mg/day from July 2005 through April 2007. Radiography revealed osteonecrosis of the jaw and a well-demarcated interface between necrotic and vital bone. BRONJ was completely removed with sequestrectomy of the mandible. The patient has been followed for 9 months since surgery and continues to do well. Case 2 involved a 62-year-old woman diagnosed with bone metastases from breast cancer who was referred to our clinic for evaluation of necrotic bone and pus discharge from the left maxillary molar region. The second maxillary left molar had been extracted by her dentist. Pamidronate sodium hydrate was administered parenterally at 90 mg/month from September 2004 through April 2006, and then zoledronate sodium hydrate at 4 mg/month from May 2006 through October 2007. Radiography revealed osteonecrosis of the jaw and maxillary sinusitis. BRONJ was completely removed with sequestrectomy of the maxilla. The patient has been followed for 5 months since surgery and continues to do well. Surgical intervention thus appears warranted to remove necrotic bone in cases of BRONJ.

1. Introduction

Bisphosphonates (BPs) inhibit bone resorption and are widely used to treat skeletal complications in patients. However, consensus is still lacking on the management of osteonecrosis of the jaw (ONJ) associated with the use of BPs. Recently, numerous patients with ONJ have been reported in the literature [1–3]. We report herein two cases of BP-related ONJ (BRONJ) that were treated surgically.

2. Case reports

2.1. Case 1

A 72-year-old man was referred in August 2008 with swelling of the right mandibular gingiva. Medical history included myocardial infarction in 1998, gastric carcinoma in 2000, hypertension, and diagnosis of osteoporosis and transcervical fracture in June 2005. He had taken oral BP (risedronate sodium hydrate) at 2.5 mg/day from July 2005 through April 2007. Family history was unremarkable. In August 2008, the patient was referred to us for pain and swelling with pus discharge in the right mandibular gingiva. In April 2008, the mandibular first molar had been extracted by his dentist. General condition was not problematic. The neck was free of pathological adenopathy. Physical examination revealed a large area of exposed necrotic bone involving most of the right body of the mandible.

Orthopantomography showed osteolytic radiolucencies and radiopacities above the inferior alveolar nerve of the right

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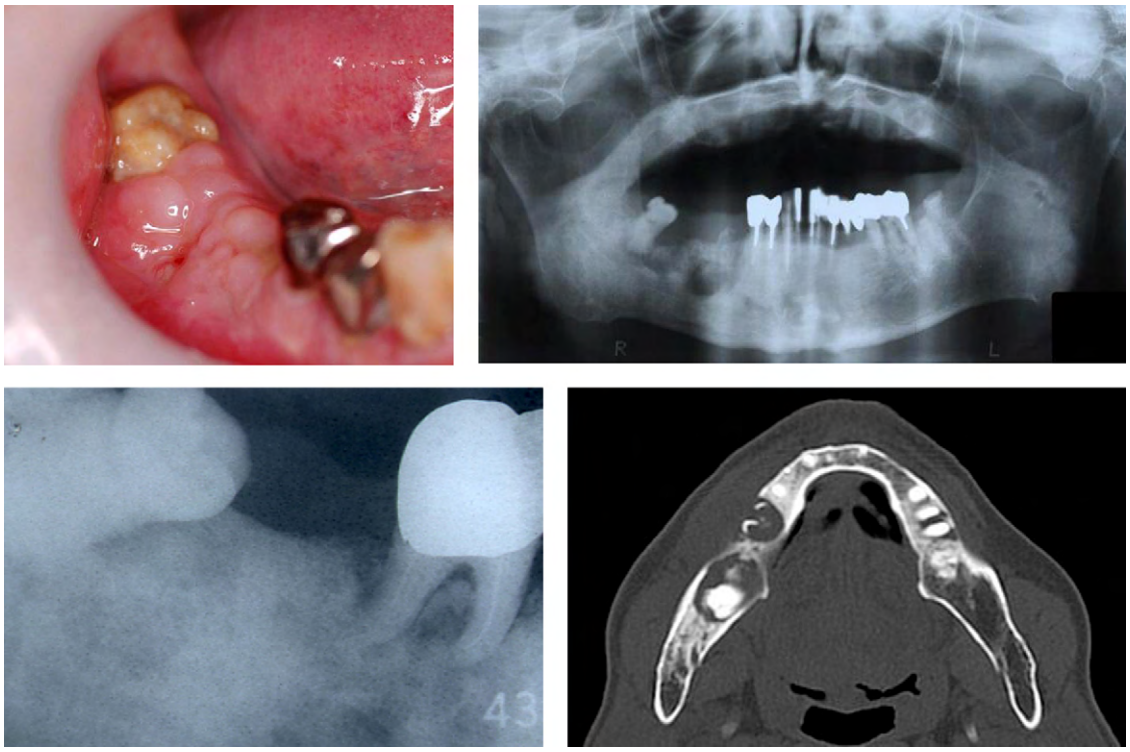

Fig. 1. Gingiva of the right mandibular molar region showing diffuse swelling and fistulous tract with pus discharge in several places. Orthopantomography showing osteolytic changes of radiolucency and radiopacity above the inferior alveolar nerve of the mandible. Periapical film showing already diffuse sclerosing osteitis before extraction (after oral bisphosphonate (BP) therapy for 2 years 9 months). Computed tomography (CT) of the mandible showing significant sequestrum and irregular ragged buccal surface margins.

mandibular body. The sequestrum was well demarcated on the jaw. A periapical film of the area provided by his dentist showed diffuse osteosclerosis before extraction. Computed tomography (CT) of the mandible revealed a significant sequestrum and irregular, ragged margins of the buccal surface (Fig. 1). Based on these findings, the clinical diagnosis was BP-associated osteonecrosis of the mandible. General blood analysis gave normal results: white blood cells (WBC), 5900/μl; red blood cells (RBC), 411×10^4/μl; haemoglobin (Hb), 12.6 g/dl; and C-reactive protein (CRP), 0.25 mg/dl. Bacterial analysis identified α-streptococcus in the fistulous tract of the mandible. The result of cytological diagnosis was class I (Papanicolaou). The initial biopsy was identified as sequestrum based on defluvium bone, and no evidence of metastatic disease was detected. BP therapy was stopped 3 days before molar extraction by his dentist. After consultation with the patient's physician, his opinion was that the risk of a pathological fracture due to osteoporosis was low, despite suspension of BP treatment. Local irrigation with povidone iodine and antibiotic therapy was started, but symptoms did not improve. Cessation of BP therapy lasted for 6 months, and then surgery was performed.

In October 2008, under local anaesthesia with intravenous sedation, an intraoral incision was made to perform decortication and sequestrectomy of the involved portion of the mandible, preserving the inferior alveolar nerve. The operation consisted of sequestrectomy and saucerization to preserve the inferior border of the mandible and lingual surface cortical bone. A large quantity of granulation tissues fit the circumference of the sequestrum (Fig. 2). However, healthy bone was well demarcated. The oral mucosa was closed with aspiration drainage for 24 h. The resected specimen showed strongly adhesive granulation tissues and bacterial mass. Pathological evaluation of the resected mandible confirmed necrosis of the mandibular bone with bacterial overgrowth (Fig. 3). The patient has been followed for over 9 months post-surgery and continues to do well (Fig. 4).

2.2. Case 2

A 62-year-old woman was referred in September 2008 with swelling of the right maxillary gingiva. She was referred to our clinic for evaluation of halitosis and pus discharge from the upper maxillary molar region. Medical history included diagnosis of breast cancer, with initial treatment involving mastectomy in August 1992. After initial diagnosis in August 2004, she developed multiple bone metastases and received chemotherapy and hormone therapy. Pamidronate sodium hydrate was administered parenterally at 90 mg/month from September 2004 through April 2006, followed by zoledronate sodium hydrate at 4 mg/month from May 2006 through October 2007. Family history was unremarkable. In December 2007, the left maxillary second molar was extracted by her dentist after cessation of BP therapy lasting for 2 months. However, she experienced pus discharge from the left maxillary molar region and the socket remained open. General condition was not problematic and the neck was free of pathological adenopathy. Physical examination revealed necrotic bone and pus discharge from the upper maxillary molar region.

Orthopantomography clearly showed sequestrum in the left maxillary molar region and the floor of the maxillary sinus was dome-shaped. Periapical film of the area provided by her dentist showed osteitis of the lamina dura before extraction. CT of the maxilla revealed new periosteal bone of cortical bone above the sequestrum of the maxillary left molar region. The left maxillary sinus showed prominent opacification due to inflammation. Acute-phase symptoms of paranasal sinusitis were observed and the patient was considered to have contracted acute maxillary sinusitis (Fig. 5). General blood analyses indicated anaemia with no renal insufficiency, with: WBC, 5800/μl; RBC, 251×10^4/μl; Hb, 8.3 g/dl; platelets, 26.4×10^4/μl; blood urea nitrogen, 11.9 mg/dl; and creatinine, 0.16 mg/dl. Bacterial analysis identified α-streptococcus and *Neisseria* in the open socket. The result of cytological diagno-