

## A case of nasal septal abscess caused by medication related osteonecrosis in breast cancer patient



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### ABSTRACT

Antiresorptive drugs have been widely used to treat patients with hypercalcemia caused by malignancy, bone metastasis, multiple myeloma, and osteoporosis. However, it is well known that antiresorptive drugs can cause osteonecrosis of the jaw (ONJ). Herein, we report a rare case of nasal septal abscess caused by medication related osteonecrosis of the jaw (MRONJ) in a breast cancer patient.

A 69-year-old woman was referred to our clinic for evaluation of nasal obstruction. Physical examination revealed a cherry-like swelling of the nasal mucosa emanating from the septum that obstructed both nasal cavities and a fistulous tract showing pus discharge after extraction of the bilateral maxillary central incisors (MCI) and the right maxillary lateral incisor (MLI). Computed tomography and panoramic radiography revealed extensive osteonecrosis of the maxilla and swelling of the nasal mucosa. The clinical diagnosis was nasal septal abscess caused by osteonecrosis of the maxilla.

Surgical procedure was undertaken for this case. An indwelling drain was placed in the oral cavity, and sequestrectomy was performed with incision and drainage of the anterior portion of left nasal septum. The patient was doing well at the 7-month follow-up. The patient had a medical history of breast cancer with bone, lung, liver metastases, and had received intravenous bisphosphonate, which is one of the antiresorptive medicines, over the past 4 years. We suspect that this history played an important role in MRONJ induced nasal septal abscess.

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## 1. Introduction

In recent years, bisphosphonate-related osteonecrosis of the jaw (BRONJ) is gaining clinical attention. Many cases of BRONJ have been reported in Europe and the United States since 2003, and similar cases have also been documented in Japan. The use of bisphosphonates (BPs) was approved in Japan in 2006, and since then, many patients have been given BPs for over 3 years, which is suspected to be the cause for this condition. In 2014, American Association of Oral and Maxillofacial Surgeons (AAOMS) recommend changing the nomenclature of BRONJ to medication-related osteonecrosis of the jaw (MRONJ) [1]. This changing is justified to accommodate the growing number of osteonecrosis cases

involving the maxilla associated with other antiresorptive and antiangiogenetic therapies.

We report a rare case of nasal septal abscess caused by MRONJ in a breast cancer patient. The nasal cavity is separated in the midline by the nasal septum into a right and left side. The nasal septum is composed of cartilage in its front end and bone toward the back of the nose. There are three contributors to the bony septum: the perpendicular plate of the ethmoid bone, vomer bone, and maxilla bone. Therefore, although the inflammation and osteonecrosis of maxilla bone will easily spread to the nose and paranasal sinus, there has not been a report that a nasal septal abscess was caused by MRONJ. We discuss the diagnosis of this disease and treatment strategy for this disease referring to previous reports.

## 2. Case report

A 69-year-old woman presented to our outpatient department because of nasal obstruction in September 2010. She denied any

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history of nasal surgery, bleeding tendency, diabetes mellitus, or trauma. She received a dental implant in the right MCI and MLI in 2000. She was referred to a local dental clinic because of mobile teeth and pain at the time of occlusion, and she had the bilateral MCI and the right MLI extracted between June and August in 2010. The patient had medical history of breast cancer with bone, lung, liver metastases, and received intravenous BPs over the past 4 years (2006–2010).

Physical examination revealed a cherry-like swelling of the nasal mucosa emanating from the septum that obstructed both nasal cavities and a fistulous tract with pus discharge that occurred after extraction of the bilateral MCI and the right MLI at a dental clinic (Fig. 1). A complete blood cell count showed total white cell count of  $7300/\text{mm}^3$  and a white cell differential count of 69.5% neutrophils. In addition, a high C-reactive protein (CRP) level (10.0 mg/dL) was also noted. Panoramic radiography revealed continuity between the upper right first apex of the root of a tooth and the nasal cavity. Contrast-enhanced computed tomography (CT) of the paranasal sinuses revealed a nasal septal abscess completely filling the entire nasal cavity with small gas bubbles within the abscess cavity. In addition, necrotic nasal septal cartilage was noted (Fig. 2).

Under local anesthesia, sequestrectomy was performed by otolaryngologists and oral surgeons. We removed the necrotic bones as much as possible and observed continuity between the anterior nasal spine of the maxilla and the inner nasal septal cartilage membrane; an indwelling drain was placed in the oral cavity, and incision and drainage of the anterior portion of the left nasal septum were performed. Some necrotic septal cartilage was removed to enable drainage of septal abscess on the right side. The incision site was not sutured for drainage. Finally, bilateral nasal Vaseline gauze packing was inserted. The drain was removed 3 days after surgery and the gauze after 7 days. No swelling of the nasal mucosa emanation and saddle-nose were observed. The patient was doing well at the 7-month follow-up (Figs. 3 and 4).

### 3. Discussion

Antiresorptive medicines have been widely used to treat hypercalcemia related to malignancy, bone metastasis from malignant tumor, multiple myeloma, and osteoporosis. BPs, which is one of the antiresorptive medicines, were approved in Japan in

April 2006. The BPs, pamidronate and zoledronic acid, act at sites of active bone remodeling by binding to hydroxyapatite, inhibiting osteoclast development and migration, and inducing osteoclast cell death, thereby decreasing bone resorption without affecting bone mineralization [2]. One of the most clinically significant complications of BPs therapy, osteonecrosis of the jaw (ONJ), has become known only relatively recently. ONJ is more likely to appear in the mandible (73%) than the maxilla (22.5%) [3]. Zometa (Zoledronic Acid) was the BP used in this case. In June 2010, the Zometa information package was updated to include the information regarding the adverse effect of ONJ.

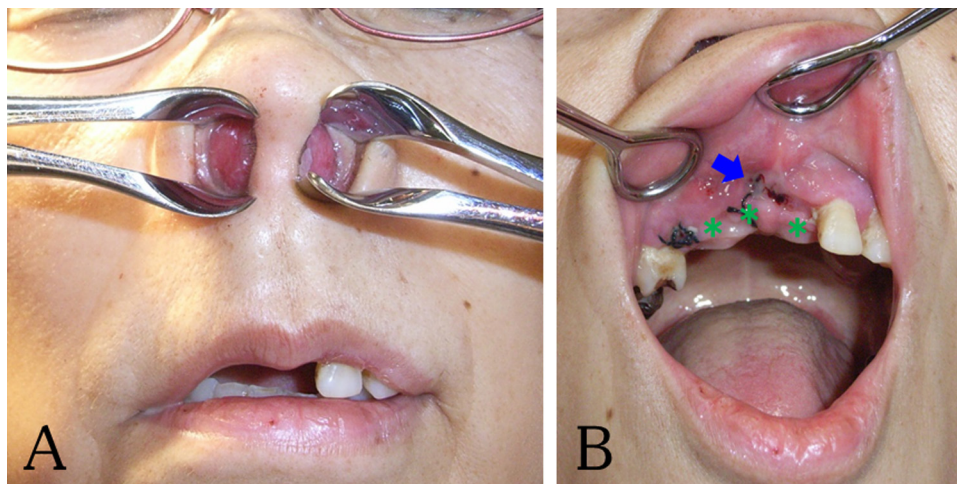
The American Association of Oral and Maxillofacial Surgeons (AAOMS) set the following criteria for the case definition of MRONJ in 2014:

1. The patient is or has been treated with antiresorptive or antiangiogenic agents;
2. Exposed bone or bone that can be probed through an intraoral or extraoral fistula in the maxillofacial region has been persisted for more than 8 weeks; and
3. There is no history of radiation therapy to the jaws.

Our patient met all the three criteria. There is no doubt that this case has to be diagnosed as MRONJ; however, it is difficult to know when the fistula started to form. Therefore, it is suggested that abscess was formed due to incomplete cure without epithelization after the tooth extraction, which expanded to nasal cavity.

The type of BPs and duration of exposure increase the risk of MRONJ [4]. A study in Japan reported a mean duration of 25.7 months (range 3–59 months) of exposure in the case of IV BPs therapy and 28.5 months (range 3–68 months) in the case of oral BPs therapy before ONJ development [5].

Generally, there are no adequate data to identify the pathophysiology of this disease process. BPs are potent inhibitors of osteoclasts and retard skeletal repair processes associated with trauma. It has been postulated that the constant use of the jaw bones resulting in minor trauma and a continuum of bone remodeling is the cause of preferential accumulation of the BPs, which, in turn, leads to osteonecrosis [6,7]. Another study suggests that MRONJ results from marked suppression of bone metabolism that results in accumulation of physiologic microdamage in the jaw bones, thereby compromising biomechanical properties. Trauma and infection inherent to the location of the jaws within



**Fig. 1.** Findings of physical examination. (A) Bilateral nasal mucosa was swelling and redness. (B) Extracted tooth (green asterisk) and pus discharge from a fistulous tract (blue arrow) were observed. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of the article.)

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