



Case Report

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Case Report on Bisphosphonate Related Osteonecrosis of the Jaw

Dr. Nabeel Mobarok Ali *

Corresponding Author: Dr. Nabeel Mobarok Ali, Department of Oral and Maxillofacial Surgery, Eastman Dental Institute, 47-49 Huntley Street, WC1E 6DG, University College London, London, UK /Consultant Oral and Maxillofacial Surgeon, IBN Sina Specialised Hospital, House #68, Road #15, Dhanmondi, Dhaka, 1209, Bangladesh.

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Abstract

This is a case report that exhibited some unusual findings which may help other clinicians diagnose the patient's problem. It reminds us of the importance of a thorough history-taking session and consideration of all the medications a patient is currently prescribed by their GP. This knowledge enables other clinicians to make informed decisions and adjust treatments accordingly. Unfortunately, there is a lack of good coordination between medical practitioners and dentists in many countries around the world. Neither field explores how lack of clarity can lead to discomfort and poor treatment prognosis. This is especially true in regards to medications prescribed. This case was of a lady who suffered from Bisphosphonate-related osteonecrosis of the jaw. This discovery of side effects from medication is relatively new, thus not many doctors consider the ramifications of giving patients drugs that are susceptible to causing changes in the oral cavity. This is a problem that can easily be eliminated if proper liaising practices are maintained.

Keywords: BRONJ, Bisphosphonate Related Osteonecrosis of the Jaw, Osteonecrosis, Bisphosphonate

Introduction

Osteonecrosis of the jaw (ONJ) is defined as exposed, necrotic bone in the maxillofacial region for at least 8 weeks in patients receiving an antiresorptive medication for primary or metastatic bone cancer, osteoporosis, or Paget's diseases, without a history of radiation therapy to the jaws (6). This was later modified by the addition of bone that can be probed through an intraoral or extraoral fistula.

The first ONJ cases were reported in 2003 and 2004, and despite it being quite a recent discovery, a lot of research and significant understanding has been achieved. It occurs when the blood supply to the bone is disrupted, causing weakness and decay to the bone structure, chipping away small pieces eventually causing significant damage or total collapse of the affected bone.

Osteonecrosis comprises bone resorption and abnormal formation; initially causing necrosis of hematopoietic cells and adipocytes leading to interstitial marrow oedema. The bone cells become necrosed about two to three hours after anoxia, but histological signs begin to appear after a period of one to three days. The affected site undergoes reactive hyperaemia as the capillaries re-establish vascularisation to an extent at the periphery of the necrotic area, leading to the commencement of a repair process consisting of both bone resorption and production that tries to compensate for the

necrosed bone, but fails to do so up to a proper physiological standard. The newly formed bone is laminated onto dead trabeculae (3). The necrosis itself is not the cause of loss in structural integrity and fractures, but rather the resorptive process.

Bisphosphonates are medications that act against osteoclast-mediated bone loss from metabolic diseases of bones, including osteoporosis, osteogenesis imperfecta, Paget disease, multiple myeloma, or for management of malignant hypercalcemia (1,2). They are generally a well-tolerated drug, causing few side effects ranging from mild transient low-grade fever, arthralgias, nausea, and rash to rare side effects like Osteonecrosis of the jaw. Several reports have found that oral consumed bisphosphonates have a 0.01% to 0.04% chance of causing osteonecrosis in the jaw, or 2 patients per every 100,000 every year, thus making it an extremely remote occurrence, however, this rises to 0.08% - 12% when administered via IV route. 67% of cases are preceded by tooth extraction, 7% have arisen from some form of denture sores and 26% have no predisposing factors. Additionally, elevated serum levels of creatinine have been observed in some cases. However, recent reporting has shown osteonecrosis of the jawbones as a potentially serious complication associated with the long-term use of these drugs (1,2,6).

This complication is more frequent in women than in men and the mean age is 66 years. The incidence is higher in the mandible than in the maxilla, with a 2:1 ratio. The criteria for the diagnosis of BRONJ include 1 - current or previous treatment with antiresorptive; 2 - exposed bone or bone that can be probed through intra or extraoral fistula in the maxillofacial region persisting for more than 8 weeks; and 3 - no history of radiation therapy to the jaw. The staging of the disease is based on the severity of symptoms and extension of the clinical and radiographic findings. The main objective of the treatment of BRONJ is to preserve the quality of life, control pain and infections, and prevent the development of new areas of necrosis. Treatment strategies range from conservative local wound care to aggressive respective surgery of all necrotic bones. Conservative strategies include systemic antibiotics, oral antibacterial rinse, and debridement of loose necrotic bone. Recent studies have demonstrated to be promising the use of non-surgical therapeutic strategies such as platelet-rich plasma, parathyroid hormone, and hyperbaric chamber (2,3,4,5).

The usual Radiological presentation of BRONJ will present as:

- 1) Diffuse sclerosing of bone
- 2) Thickening of lamina dura
- 3) Poor or no healing ate extraction sites
- 4) Irregularity of the cortical bone
- 5) Ill-defined radiolucency of the jaw with sequestrate of bone (8)

Case Report

A rare atypical case of a patient with osteonecrosis of the jaw due to bisphosphonate use.

Case Referral

A 63-year-old female patient attended our clinic complaining of pain on the lower border of the mandible and both premolar teeth which initiated five days prior. She works as an online tutor, comes from a middle socio-economic background, and lives with her husband who is also retired. She is a non-smoker and non-alcoholic. After taking her history where she revealed apart from being diagnosed with osteoporosis, she claimed that she was only prescribed vitamins as treatment for the past two months, otherwise, she was very fit and healthy, so we proceeded in performing an extraoral and intraoral clinical examination. Extraoral examination showed that all her vital readings were within range, and systemic examinations including cardiovascular, respiratory, GI, and vascular were all normal. She only had three fillings in her teeth, and her most recent dental treatment was several years ago. We noticed that the gum around the right mandibular premolars had become inflamed and erythematous, however, there was no tooth mobility or any presence of cavity formation. All other inspections revealed nothing remarkable, so we performed an OPG and premolar periapical radiographs revealing slight inflammation of the bone, but no defects to the dental pulp. After which we prescribed anti-inflammatory medication and safety net advice; with a plan to review in two weeks.

However, she returned to us within a week citing immense pain in her jaw with some discharge, and upon re-examining her, pungent halitosis and worsening of her infection to the extent of slight bony exposure around her second premolar was discovered. This appeared far too aggressive and atypical which made us revisit her history. Nothing new was found, so further inquiry about what vitamin medication she was taking for her osteoporosis and whether she had a sample. Unfortunately, she didn't have any at present but revealed she took the medication once a week, early in the morning on an empty stomach with special instructions. Upon showing her a sample of the medication alendronic acid in combination with vitamin D3 (cholecalciferol), sold under the trade name Bonemass D, she was able to recognise and corroborate this was the medication she was prescribed. On asking why she didn't specify the medication the first time, she brushed it off thinking it was only vitamins, claiming her doctor explained it was a very generic medication. At this point, we suspected that this was bisphosphonate-related osteonecrosis of the jaw (BRONJ), even though she had no prior dental extractions or any of the other symptoms commonly associated with these patients. Our clinical diagnosis was confirmed by an urgent radiograph which showed diffuse sclerosing and erosion commencing at the lamina dura. As she also had pyrexia, the patient was informed she needed further blood tests for confirmation which got her admitted into the hospital where she was put on IV antibiotics and IV analgesia. After a few hours, we were notified of her blood tests which showed a marked increase in inflammatory markers, and our

diagnosis was confirmed a few days later when we received her histopathology report which presented with an irregular margin of the trabeculae, hypo vascularisation and separated sequestrums with necrotic bone with empty lacunae.

Diagnosis and Treatment Plan:

Surgical intervention for BRONJ is usually a last resort due to the impaired healing ability of the affected bones. As no long-term or controlled studies have established a set protocol in the management of BRONJ, an article from AAOMS (American Association of Oral and Maxillofacial Surgeons) updated last in 2014(7), which is based on the consensus of a panel discussion, is the best available guide to therapy.

To establish a proper accepted treatment guideline and collect data to assess the prognosis in patients who have used either IV or oral bisphosphonates, the AAOMS proposes the use of the following staging categories and their respective treatments.

- BRONJ Stage 0: Nonspecific findings: dull aching bone pain in the body of the mandible, odontalgia with no odontogenic cause, sinus pain, periodontally involved teeth not explained by chronic periodontitis, and periapical/periodontal fistula not associated with pulpal caries. Treatment: symptomatic treatment, with conservative management of local factors, including chronic pain management and possible antibiotic therapy.
- BRONJ Stage I: Findings: exposed/necrotic bone, asymptomatic, no evidence of infection. Treatment: antimicrobial rinses and no surgical intervention.
- BRONJ Stage II: Findings: exposed/necrotic bone, pain, erythema, +/- purulent drainage. Treatment: antimicrobial rinses, systemic antibiotics or antifungals, analgesics.
- BRONJ Stage III: Findings: exposed/necrotic bone, pain/infection, pathologic fracture, extraoral fistula, osteolysis to the inferior border. Treatment: antimicrobial rinses, systemic antibiotics or antifungals, analgesics, surgical debridement, or resection.

This patient fell under the Stage I category. After she completed her treatment at the hospital which comprised antimicrobial rinses and systemic antibiotics IV for two days, she was discharged and told to continue her antibiotics orally for five more days and told to stop using bisphosphonate. She returned to us with pain in her second premolar after two weeks. The presence of interdental caries had made the pulp necrotic, we told her of the treatment options, and she opted to have root canal treatment which we performed. After 6 months of follow-up, the area seemed to fully heal, her endodontic treatment seemed fine and she had no further complaints. She had stopped taking bisphosphonates during those 6 months.

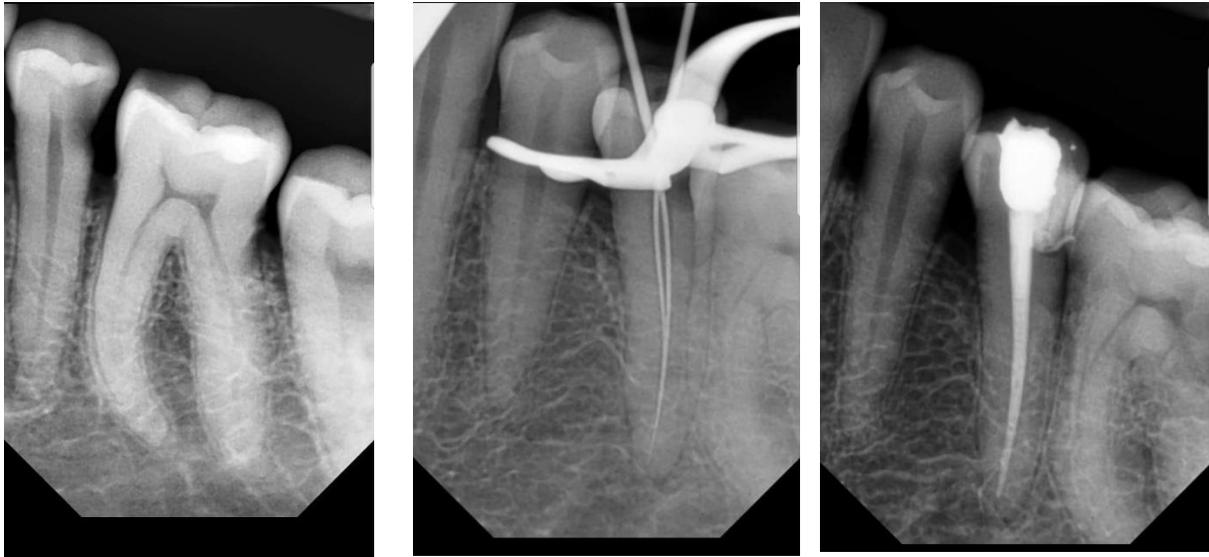


Fig: The Initial DX of her teeth to completion of the root canal.

Conclusion

This was certainly a very intriguing case that made us reflect on many of our protocols in place and gave rise to many learning points for all of us. Firstly, we learned that despite taking a thorough history, there are at times when critical information can be overlooked or misinterpreted, as in this case when she mentioned vitamins, the drug history should have been explored further in the first visit. Secondly, we investigated further as to why she was under the impression that she was only taking vitamins, so upon liaising with her respected specialist who explained that for the simplicity and better compliance of the patient they tend to describe the medication as vitamins, which is a quite common practice in the Subcontinent. We thanked the doctor for the explanation and suggested they carry out an audit of appropriate counselling on commencing bisphosphonates, which he agreed to.

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MAR Dental Sciences.5.5

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