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Case Report

Mandibular Chronic Sclerosing Condensing Osteitis. Review and Evaluation of the Literature on its Clinical Presentation

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Abstract

There are several forms of osteomyelitis that can affect the mandibular bone; thus, diagnosis can be challenging. Chronic focal sclerosing osteomyelitis (CFSO), also known as condensing osteitis is a periapical lesion characterised by adaptive osteogenesis triggered by chronic odontogenic inflammation and mostly occurred in younger age group of patients. The goal of this review was to evaluate the literature on its clinical presentation and describe a Case of a female patient who had a long-standing radiopaque lesion in the right molar region of her mandible although no clinical septic symptoms were found. Clinical radiography and surgical management are reviewed in depth, with an emphasis on differential diagnosis with comparable lesions.

Keywords: *Osteomyelitis; Mandible; Condensing; Radioopaque*

Introduction

Osteomyelitis is an inflammatory process in the marrow cavity or cortical part of the bone that tends to spread away from the original infection location [1]. The mandible has a substantially greater incidence of osteomyelitis than the maxilla due to large cortical plates which are poorly vascularized, and mostly supplied from the inferior alveolar neurovascular bundle with less collateral circulation. It is substantially less common in the maxilla due to the abundant blood supply from numerous nutrient supply veins. Furthermore, the maxillary bone is thinner than the mandible [2].

The most prevalent cause of jaw osteomyelitis is odontogenic infection, which involves infected tooth pulp, periodontal disease, and extraction wounds [3]. Trauma is the second most common reason. Osteomyelitis was thought to be linked to bacteria on the skin's surface, such as *Staphylococcus epidermidis* or hemolytic streptococci and to a larger extent, *Staphylococcus aureus*. However, in the example of jaw osteomyelitis, however, the picture of *Staphylococcus aureus* as the primary pathogen does not appear to be accurate. The majority of cases are caused by aerobic streptococci (Hemolytic streptococci, *Streptococcus viridans*), anaerobic streptococci and other anaerobes such as *Peptostreptococci*, *Fusobacteria* and *Bacteroides*.

Depending on the virulence of the contributing organisms, the efficacy of the immune system and the repairing ability of the affected bones, osteomyelitis can be characterised as acute or chronic [4]. Chronic osteomyelitis is a term that describes primary or secondary osteomyelitis that lasts more than one month after the onset of symptoms [5].

Primary chronic osteomyelitis of the jaw (PCOJ) is a rare non-suppurative chronic inflammatory illness with no recognised origin. Secondary chronic osteomyelitis of the jaw (SCOJ) is significantly more common than initial chronic osteomyelitis of the jaw and is caused by bacterial infections of dental origin (pulpal disease, periodontal tissue, or retained teeth with infected pericoronal tissue, especially third molars) [6].

Osteomyelitis has been proven to be a difficult disorder to diagnose, treat and cure. Many different diagnostic procedures have been demonstrated to be effective, but many experts agree that the final diagnosis should be made using the following criteria: 1)

History and physical examination of the patient, 2) Imaging techniques, 3) Culturing, and 4) histological examination [7].

The fundamentals of chronic osteomyelitis treatment are the selection of appropriate antibiotics and the timing of surgical intervention. Antibiotic combinations are frequently more effective than single antibiotics. Antibiotic therapy can be given for a long period of time. The removal of sequestrum by surgery appears to enhance the healing process. In refractory cases of chronic osteomyelitis, hyperbaric oxygen has provided considerable advantages to patients [8].

Chronic focal sclerosing osteomyelitis of the jaw (CFSO) is a periapical lesion characterised by adaptive osteogenesis triggered by chronic odontogenic inflammation [9]. In most cases, this lesion appears in the mandibular molar region in younger age group. In our department, there has been an increase in the number of patients of reactional focal condensing osteitis, which typically affects young people and has long-term infection symptoms. As a result, the current review report attempted to focus on current recommendations for treating CFSOJ cases and provide a detailed case scenario of its clinical presentation. We characterized the pervious published cases of Chronic Sclerosing Osteomyelitis of the jaw (Table 1).

No	Author	Date	Age of the patient	Sex	Resolution	Included teeth	First onset of symptoms
1	Gordon D. Douglass	1993	41 years	Female		#46	Not mentioned
2	Holly D	2009	23 years	Female	The patient was asymptomatic	At the region of extracted #36	Not mentioned
3	Holly D	2009	27 years	Male	—-	#35	——
4	Holly D	2009	32 years	Female	-----	#35 & 36	2 years
5	Fatemeh Owlia	2011	19 years	male	A symptomatic in one-year follow-up.	#15,16	20 days
6	Aya Yoshino	2011	34 years	Female	In CT and OPG images 35 months later, there were no recurrence nor inflammatory process at the left maxillary sinus.	#27	Asymptomatic
7	Shubhi Singh	2016	32 years	Female	4 weeks	Left mandible	8 years
8	Yamir Budhwar	2018	60 years	Female	7 days post-operative	Edentulous In #37 region	4-5 months
9	Valen Dela D'souza	2019	45 years	Female	1 month	#45	2 months

Table 1: *Summary of pervious published cases of chronic sclerosing osteomyelitis.*

Clinical Presentation

A 38 years old African female, came to the student dental clinics, Dental college and Hospital, Taibah University, Al-Madinah Al-Munawwrah, Saudi Arabia to complete her prosthetic treatment. Intra-oral examination revealed multiple missing teeth, crowns on the upper anterior teeth and slight bony irregularities on the right side of the edentulous ridge with dissimilarity between the right and left residual ridges, with no apparent signs of infection or inflammation in the area. The patient was asymptomatic (Figure 1).

Figure 1: Intraoral photograph showing mandibular teeth and the normal covering mucosal surface without signs of infection.

An ortho-pantomograph (OPG) revealed numerous missing teeth as well as endodontically treated teeth. A radiopaque sclerotic mass of the size approximately 2 * 1 cm on the right side of the mandible distal to tooth number 46 was noted. The lesion is unilocular extending from the alveolar ridge to the Inferior Alveolar Canal (IAC) (Figure 2). Cone beam computed tomography (CBCT) assessment revealed no effect on the inferior alveolar canal (Figure 3).

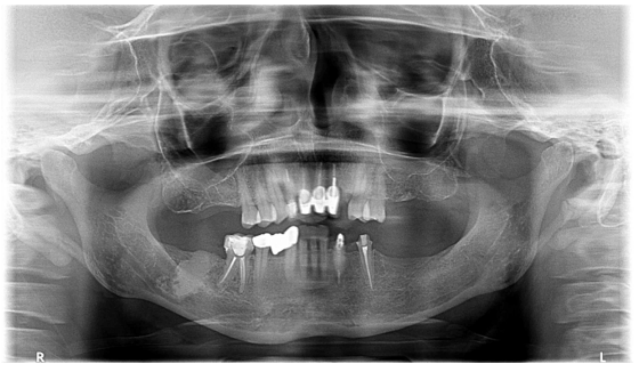

Figure 2: Orthopantomogram photograph showing unilocular radiopaque lesion at the right mandibular body region which extends from the alveolar ridge till the mandibular inferior alveolar canal.

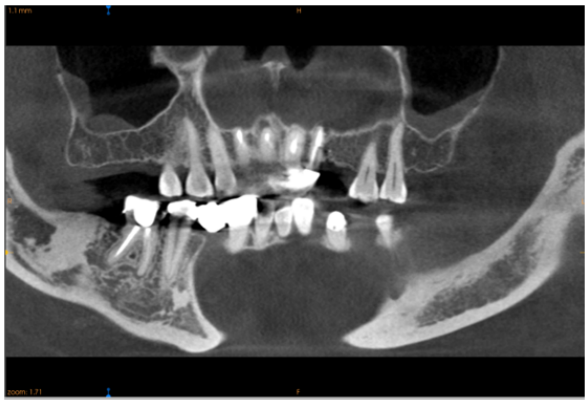

Figure 3: Orthopantomogram photograph showing unilocular radiopaque lesion at the right mandibular body region which extends from the alveolar ridge till the mandibular inferior alveolar canal.

Differential diagnosis included: Idiopathic osteosclerosis, osteoma, sclerosing osteomyelitis and fibrous dysplastic lesion. After Consultation with oral and maxillofacial pathologist a decision was made to take an incisional biopsy.

Histopathological evaluation revealed fragments of devitalized bone with empty lacunae, non-specific inflamed connective tissue, areas of hemorrhage, necrosis and bacterial colonies (Figure 4a). In higher power view there was reversal line within the bone trabecula (Figure 4b). All the features were suggestive of focal chronic sclerosing osteomyelitis.

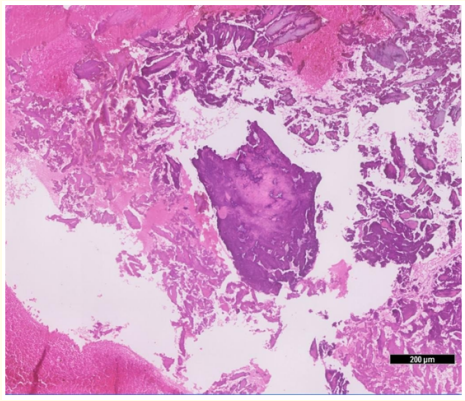

Figure 4a: Histopathological slide photograph(x200) showing fragments of devitalized bone, non-specific -inflamed connective tissue, areas of hemorrhage, necrosis and bacterial colonies.

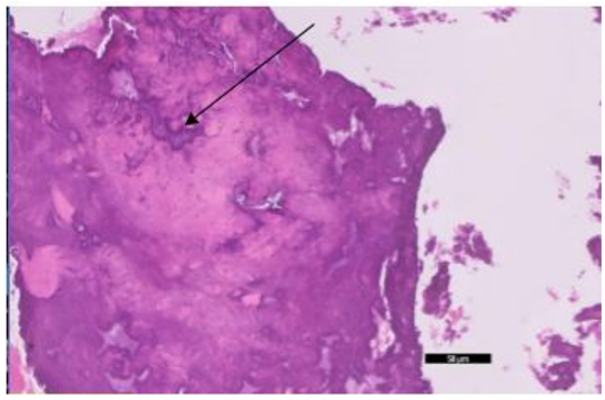

Figure 4b: Histopathological slide photograph(x50) showing reversal line within bone trabecula (black arrow).

Surgical procedure

2% lidocaine with 1:100,000 epinephrine was administered via Inferior alveolar nerve block and buccal infiltration. Sulcular incision around tooth number 46 and Crestal incision extended on the edentulous ridge at the area of teeth 47 and 48. Mucoperiosteal flap was raised. Round bur and straight hand piece were used to cut the bone. Pieces of bone were taken out by the bony Rongeur. The specimen was placed in a container filled with 10% formalin and sent for histopathological examination. Primary closure was done using 3-0 polyglycolide-lactide (vicryl) suture.

Discussion

Because of the difficulties in diagnosing and classifying mandibular osteomyelitis, treatment planning might be difficult [10]. The prevalence of acute infected osteomyelitis of the jaws has decreased in the modern world due to the availability of newer antimicrobials, increased awareness and improved oral health care [11]. However, we still see cases of persistent noninfectious osteomyelitis.

Osteomyelitis as an infectious lesion has broad spectrum starting from small focal sclerosing osteomyelitis up to diffused supportive osteomyelitis, which depends on virulence of the causative bacteria and the host immunity [12], they play a great role in bone remodeling after the inflammation [13]. Also, the postponement of treatment, improper curettage after extraction of a tooth with periapical lesion and absence of proper antibiotic coverage could lead to occurrence of osteomyelitis either suppurative or sclerosing type [14].

We evaluated idiopathic osteosclerosis (IO), fibrous dysplasia, osteoma, hypercementosis and focal sclerosing osteomyelitis (FSO) in the differential diagnosis (DD) for this case and The CFSOJ was the diagnosis based on the findings described in the histological section.

IO is an asymptomatic lesion that most usually affects the molar and premolar regions of the mandible, whereas osteoma affects the ramus and body of the mandible [2].

Both lesions are radiographically indistinguishable from FSO; nonetheless, both IO and compact osteoma have the same histological features, which include typical appearance of thick bone matrix with little bone marrow gaps and no infiltration of inflammatory cells [2,10,13].

The third DD is fibrous dysplasia. This lesion is usually observed in the maxilla and has a radiological appearance of ground glass. Fibrous dysplasia has a distinct “Chinese soap” histological pattern, which includes fibroblastic stroma and immature woven bone trabeculae without osteoblast rimming [15,16].

IO, compact osteoma, and fibrous dysplasia can be ruled out of our case’s DD based on the aforementioned criteria. The treatment for osteomyelitis varies depending on whether or not a bacterial infection is active [8].

Condensing osteitis (CO), also known as Focal Sclerosing Osteomyelitis is a long-term, symptomless degenerative change in bone structure caused by continual low grade inflammatory stimulation [17]. This disorder primarily affects children and teenagers, and it is most prevalent in the mandibular premolar and molar regions, affecting 4% - 7% of the population [18]. The lesions are more common in the third to seventh decades of life, and both genders are affected equally [3] though some investigations have found a minor female predilection [18].

Non-neoplastic cementum deposits abundantly along the normal root cementum, resulting in hypercementosis. In the vast majority of cases, the underlying cause is unclear [17]. Adults are the most commonly affected and the prevalence increases with age [19] Hypercementosis is depicted as an enlargement encircling

the afflicted root. Internally, the afflicted root cementum has a radiopaque zone with a well-defined border [20]. Histopathologic findings reveal an excess of deposited cementum over the underlying one. The deposited cementum may be hypocellular or have patches of cellular cementum that resemble bone (osteocementum).

The goal of all therapeutic agents for acute and chronic osteomyelitis is to raise the host's defense against the pathogens that cause the infection, allowing the body to recover [9]. In septic cases, the most important therapeutic goal is to keep the infection under control. The treatment should aid in the re-establishment of appropriate blood flow in addition to treating the infection. For such goals, antimicrobial medication as well as surgical intervention should be used. The surgical process requires removing all infected and necrotic tissue while leaving the peripheral bone in place for future healing and rebuilding [8,9]. For persistent patients, hyperbaric oxygen (HBO) therapy has also been suggested. This type of therapy aids in the fight against any anaerobic bacteria that may be present in cases of osteomyelitis by enhancing tissue oxygenation. The use of HBO in the treatment of osteomyelitis is still controversial [3].

Although there was no sepsis in the present case, the development of these extensive radiopacities, particularly around the teeth, may bother the surgeon during extraction and lead the patients to be misdiagnosed. Therefore, the recognition of these expanding lesions should be further addressed [21]. After biopsy, the definitive treatment in this case study was follow-up with periodic x-ray examination. Because the case was asymptotic, the region was healed and asepsis was proven, no further intervention was required [22].

Conclusion

From the present review report, we can conclude that focal sclerosing osteomyelitis lesions are longstanding chronic form of aseptic osteomyelitis, which should be kept under observation and no further surgical intervention may be needed.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

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Bibliography

1. Dover MS. Principles of oral and maxillofacial surgery. Br J Oral Maxillofac Surg. 1993;31:199.

2. Prasad KC, Prasad SC, Mouli N, Agarwal S. Osteomyelitis in the head and neck. Acta Otolaryngol. 2007;127:194-205.

3. Schuknecht BF, Carls FR, Valavanis A, Sailer HF. Mandibular osteomyelitis: Evaluation and staging in 18 patients, using magnetic resonance imaging, computed tomography and conventional radiographs. J Cranio-Maxillo-Facial Surg. 1997;25:24-33.

4. Owlia F, et al. A localized sclerosing osteomyelitis at the periapex of a vital tooth: report of a misdiagnosis. J Dent Res Dent Clin Dent Prospects. 2011;5:102-105.

5. TG. Diagnosis and Treatment of Osteomyelitis of the Jaw - A Systematic Review (2002-2015) of the Literature. J Dent Oral Disord. 2017;4.

6. Kakoschke TK, Aljohani S, Kaeppler G, Ehrenfeld M, Otto S. Osteomyelitis of the jaws. Osteologie. 2017;26:236-243.

7. Elsayed SA, Ayed Y, Alolayan AB, Farghal LM, Kassim S. Radiographic evaluation of hypercementosis in Al-Madinah region, KSA: A retrospective cross sectional study. Saudi Dent J. 2019;31:S27-S28.

8. Pattman R, Snow M, Handy P, Sankar KN, Elawad B. Ulcerative conditions. in Oxford Handbook of Genitourinary Medicine, HIV and AIDS, 2005.

9. Yoshino A, et al. Chronic focal sclerosing osteomyelitis accompanied with bony mass protrusion into the maxillary sinus: a case report. Oral Med Pathol. 2011;15:91.

10. Singh S, et al. Chronic sclerosing osteomyelitis of the mandible treated with hemimandibulectomy and fibular free flap reconstruction. Plast Reconstr Surg Glob Open. 2015;3.

11. Scolozzi P, Lombardi T, Edney T, Jaques B. Enteric bacteria mandibular osteomyelitis. Oral Surgery Oral Med Oral Pathol Oral Radiol Endodontology. 2005;99.

12. Douglass GD TH. Chronic focal sclerosing osteomyelitis associated with a cracked tooth. Report of a case. Oral Surg Oral Med Oral Pathol. 1993;76:351.

13. Eisenbud L, Miller J, RIG. proliferative periostitis occurring simultaneously in four quadrants of the jaws. Oral Surg Oral Med Oral Pathol. 1981;51:172.

14. D'souza Martis E, Reddy KR, Rao PK, KB R, Kini R, Hegde S. Chronic sclerosing osteomyelitis: A case report on a rare complication of tooth extraction. Arch Med Heal Sci. 2019;7:251.

15. Gerlach RC, Dixon DR, Goksel T, Castle JT, Henry WA. Case presentation of florid cemento-osseous dysplasia with concomitant cemento-ossifying fibroma discovered during implant explantation. Oral Surg Oral Med Oral Pathol Oral Radiol. 2013;115:e44-e52.

16. Wu H, et al. Clinical characteristics of craniomaxillofacial fibrous dysplasia. J Cranio-Maxillofacial Surg. 2014;42:1450-1455.

17. Gunawan I, F, R, E, L, Azhari. The Variance Of Radiopaque Images Commonly Found In Periapical Lesion Using Periapical Radiographic Technique (Review Article). Dentino (Jurnal Kedokt. Gigi). 2019;IV:64-69.

18. Green TL, Walton RE, Clark JM, Maixner D. Histologic examination of condensing osteitis in cadaver specimens. J Endod. 2013;39:977-979.

19. Mupparapu M, Shi KJ, Ko E. Differential Diagnosis of Periapical Radiopacities and Radiolucencies. Dent Clin North Am. 2020;64:163-189.

20. Elsayed SA, Ayed Y, Alolayan AB, Farghal LM, Kassim S. Radiographic evaluation and determination of hypercementosis patterns in Al-Madinah Al-Munawwarah, Saudi Arabia: A retrospective cross-sectional study. Niger J Clin Pract. 2019;22:957-960.

21. Elsayed S, Alolayan A, Farghal L, Ayed Y. Generalised hypercementosis in a young female seeking extraction: Revision and update of surgical technique. J Coll Physicians Surg Pakistan 2019;29:1111-1113.

22. Holly D, Jurkovic R, Mracna J. Condensing osteitis in oral region. Bratislava Med J. 2009;110:713-715.

Volume 4 Issue 12 December 2021