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Case Report **Dental Medicine**

Maxillary Sinusitis of Odontogenic Origin- A Case Report and a Short Review of Literature

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Abstract

Maxillary sinusitis of odontogenic origin (MSOO) presents a diagnostic challenge due to its overlapping symptoms with other forms of sinusitis. We present a case of a 17-year-old male with MSOO, emphasizing varied treatment modalities. Clinical assessment revealed facial swelling and pain, prompting a differential diagnosis. Orthopantomogram and Cone Beam Computed Tomography (CBCT) confirmed odontogenic involvement. Surgical intervention included extraction, sinus lavage, and closure of oroantral communication. Postoperative recovery was successful. Discussion highlights the prevalence, diagnosis, and management of MSOO. Contemporary reports suggest odontogenic sources contribute to over half of maxillary sinusitis cases. Radiographs and CBCT aid diagnosis, delineating odontogenic involvement. Effective management includes dental evaluation and endoscopic sinus surgery, and early diagnosis is crucial to prevent complications. However, consensus on antimicrobial therapy and drainage routes is lacking. This case underscores the importance of interdisciplinary collaboration and tailored management strategies for MSOO.

Keywords: Odontogenic Sinusitis, Periapical Infection, Oroantral Communication, buccal advancement flap.

INTRODUCTION

Sinusitis can originate from odontogenic or non-odontogenic sources. Typical symptoms include mucosal swelling and thickening, with inflammation marked by purulent discharge [1]. Odontogenic cases often present with purulence, while non-odontogenic cases usually do not where an intact inferior middle turbinate is a key feature of non-purulent odontogenic sinusitis [2]. Around 30% of maxillary sinusitis cases result from dental issues, primarily in the posterior maxillary region [3]. Diagnosis typically involves multiple symptoms or signs of inflammation, including discolored nasal discharge. In cases of odontogenic maxillary sinusitis, it is confirmed by Computed Tomography Scan (CT scan), symptoms like purulent secretions, nasal obstruction, and facial pain are notable [4]. Dental procedures, implants, infections, or periapical lesions can contribute to maxillary sinusitis. Patients with odontogenic sinusitis often experience worsened facial pain when lying down due to increased sinus pressure. Other symptoms may include headaches, tenderness, and tooth-related discomfort [5]. Clinical signs such as sinus tracts or tooth-related abscesses may indicate odontogenic sinusitis. Dental interventions can alleviate sinusitis symptoms by addressing dental issues affecting sinus function [6].

We report a case of 17 years old male with right side maxillary sinusitis of odontogenic origin (MSOO). This case report stresses different treatment modalities for management of MSOO.

CASE REPORT

A 17-years-old medically fit male was referred to our department with right side facial swelling, headache and right side facial pain. Antibiotics were prescribed somewhere else, but the patient reported no improvement. Clinically, there was minimal facial edema on the right side, fullness of the right vestibule at upper molars region and upper right first molar was tender to percussion with grade I mobility. Orthopantomogram (OPG) revealed a 3-4cm periapical lesion related to roots of upper right first molar and second premolar and close relation between the roots and

maxillary sinus (Fig.1). The first molar was endodontically treated and according to the patient the treatment was completed two years ago. Cone Beam computed tomography (CBCT) showed bone resorption of bone around roots of upper right first molar and second premolar involving lateral wall of maxillary sinus (Fig.2a and 2b). Also, obliteration of the right maxillary sinus was noted. The upper right second premolar was not tender, neither mobile and positive to vitality test. A differential diagnosis of odontogenic sinusitis was made, and surgery planned accordingly. Under general anesthesia, the patient underwent extraction of upper right first molar, extermination of periapical infection, sinus lavage and closure of oroantral communication with buccal advancement flap. Intraoperatively, the root of second premolar was not exposed so the decision was to keep it under observation (Fig. 3-4). Post-operatively, antibiotics and nasal decongestion were prescribed. After two weeks the patient came for follow up and showed significant improvement with no headache neither facial pain nor oroantral communication and well healed surgical site (Fig.5).

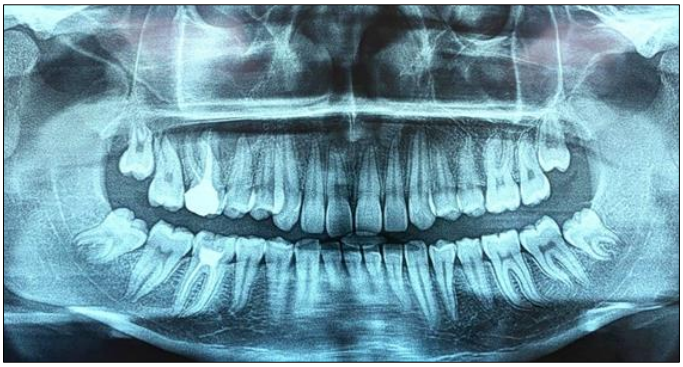

Fig. 1: OPG showing periapical lesion in relation to upper right first molar and second premolar

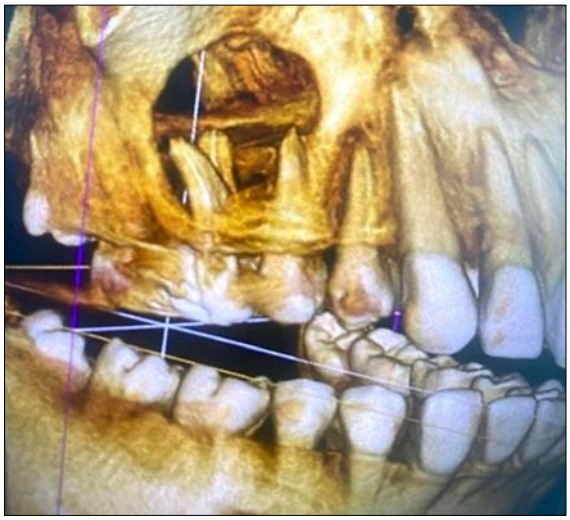

Fig. 2a: 3D CBCT showing bone resorption extending to lateral wall of maxillary sinus.

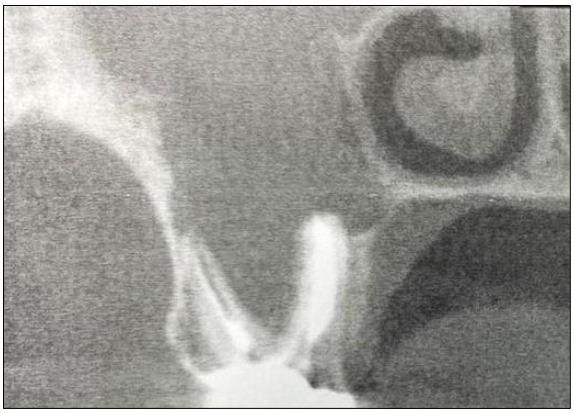

Fig. 2b: Coronal view of CBCT showing spread of periapical infection to the maxillary sinus with sinus obliteration

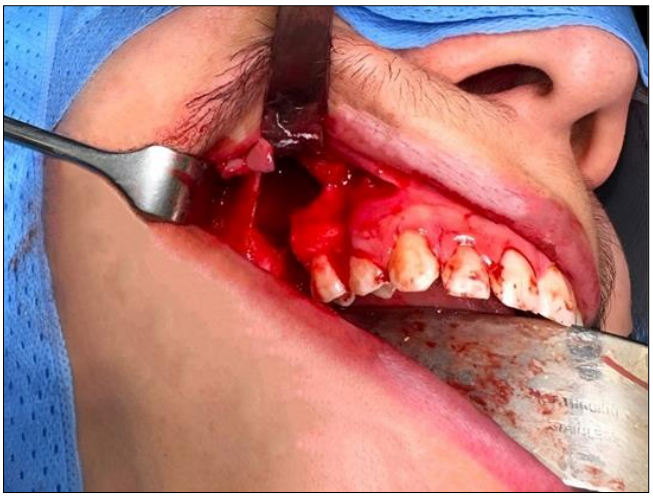

Fig. 3: surgical site after extraction of upper right first molar. Bone resorption/ dehiscence is noted

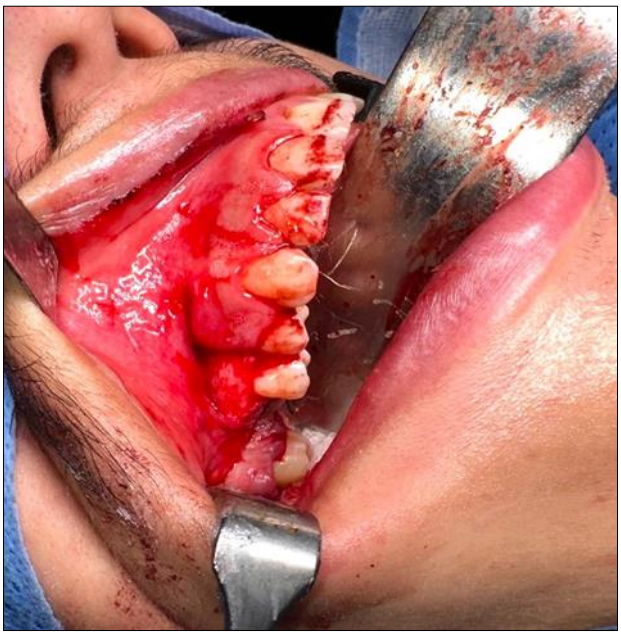

Fig. 4: surgical site after primary closure with buccal advancement flap

Fig. 5: Two weeks post operatively

DISCUSSION

Odontogenic sinusitis is a type of chronic rhinosinusitis (CRS) stemming from dental issues such as periapical abscesses, periodontitis, and inadvertent penetration of dental materials [6]. Surprisingly, recent reports suggest that odontogenic sources may contribute to over 56% of maxillary sinusitis cases [7]. Around 30% of odontogenic maxillary sinusitis cases are linked to the upper molars, followed by the premolars, anterior teeth, and upper canine and incisor roots [3]. The causes of odontogenic sinusitis are varied. Apart from factors like apical periodontitis with or without granuloma or cyst, the route of root canals penetrating the maxillary sinus is crucial. This route's anatomy can be classified into three types: the vertical distance between roots and the maxillary sinus floor, the palatal bone width, and the extent of root protrusion into the maxillary sinus. Upper first molars, comprising the highest percentage of teeth with root canals reaching into the maxillary sinus, often take a path near the sinus floor due to widened alveolar processes, contributing to odontogenic sinusitis [6]. However, at times, oroantral communications (OACs) can be asymptomatic, making them challenging to identify [8].

Assessing odontogenic sinusitis requires close collaboration between otolaryngologists and dentists, relying heavily on patient history, physical examination, and nasal endoscopy. Additionally, radiographic techniques such as dental series plain films, cone beam computed tomography, and paradental imaging serve as valuable supplementary tools [9].

Preoperative imaging methods for odontogenic maxillary sinusitis encompass Waters' projection (occipitomental view, or OM), and paranasal sinus radiography. While the latter can delineate maxillary sinus borders and the Schneiderian membrane, it often overlaps with soft tissues, posing challenges in lesion identification. Cone-beam computed tomography (CBCT) is indispensable for a more precise three-dimensional evaluation, facilitating the detection of odontogenic sources within the maxillary sinus, and elucidating the relationship between the maxillary sinus, alveolar process, and various dental structures [10].

Patients diagnosed with odontogenic maxillary sinusitis can often be effectively managed conservatively [11]. However, a thorough dental assessment and treatment plan are essential. Surgical or endoscopic intervention becomes necessary if medical treatment fails or if the complexity of the condition warrants it. The success of primary endoscopic sinus surgery (ESS) in managing sinus pathology alongside diseased teeth is well established [12]. Traditionally, such cases would have required antrostomy via Caldwell-Luc approach, but now, the majority can be addressed endoscopically [13]. This may involve ESS with or without dental treatment. Alternatively, it may include combined dental and sinus interventions. Additionally, successful treatments for maxillary sinusitis may involve endoscopic decompression and marsupialization through the nasal cavity [14].

An earlier diagnosis could help prevent misdiagnosis and complications such as abscess and osteomyelitis once the chronic disease stage has developed. Extrasinus complications were reported where 3% to 20% of patients had orbital or intracranial or osseous complications [15]. Conversely, preventing and managing predisposing factors for odontogenic sinusitis are crucial to disease avoidance. Immunocompromised patients, particularly those with poorly controlled systemic diabetes, may face increased susceptibility to odontogenic sinusitis, especially if they exhibit unclear clinical conditions in the maxillary quadrant, particularly following prior or ongoing maxillary dental procedures [16]. Lastly, obtaining early and accurate microbiological samples is vital not only for optimizing antimicrobial treatment but also for assessing the patient's response promptly after therapy initiation. These measures collectively play a pivotal role in enhancing the prognosis of odontogenic sinusitis [17].

The cornerstone of long-term management for sinusitis linked to dental problems lies in maintaining consistent control over the underlying odontogenic inflammatory source [11]. Treatment should directly address this root cause and respond promptly to any recurrence of symptoms. It's common for patients with odontogenic sinusitis due to chronic or recurrent inflammatory processes to develop some degree of an oroantral communication (OAC) to the sinus floor [8]. Simply performing surgical debridement without addressing the persistent inflammatory source of odontogenic sinusitis is likely to lead to less successful long-term outcomes.

CONCLUSION

Maxillary sinusitis of odontogenic origin (MSOO) is a common concern frequently encountered in the practices of primary care physicians, dentists, oral-maxillofacial surgeons, and otolaryngologists. Various dental conditions or procedures can lead to MSOO, including periodontal infections or inflammation, widened periodontal ligament space, periapical infections, traumatic bone cysts in the antrum, cysts affecting the maxillary membrane around lateral root apices, protruding roots into the maxillary antrum, overfilled or extruded endodontic materials, retained root tips, dental implants, and procedures like maxillary sinus lifting, injury, or mechanical damage. The complexity arises from the overlap of these different etiologies of MSOO, making medical management challenging. Successful treatment of MSOO necessitates management strategies addressing its dental origins. Presently, there is no consensus regarding the choice of antimicrobial agents, drainage methods, or other supportive measures in managing MSOO.

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Consent Form: Written informed consent was obtained from the patient's guardian for the publication of this case report.

Declaration of Figures' Authenticity: All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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