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Surgical Management Of Complex Maxillary Odontome Of Posterior Maxilla Involving Maxillary Sinus

Case Report

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Abstract: Complex odontomas arising in the posterior maxilla are uncommon, and extension into the maxillary sinus can mimic chronic sinus disease. Early recognition and appropriate surgical management are crucial to prevent recurrent sinus pathology and facial discomfort.

A 14-year-old male presented with a chief complaint of proclined maxillary anterior teeth. Radiographic evaluation using orthopantomograph, lateral cephalogram, and cone-beam computed tomography revealed a large, well-defined radiopaque mass with a thin radiolucent rim in the right posterior maxilla, extending into the maxillary sinus and associated with an impacted second molar. The provisional diagnosis of a complex odontoma was made. Under general anesthesia, surgical excision of the lesion was performed using a piecemeal approach due to its size and relation to adjacent structures, followed by removal of the impacted tooth. A minor discontinuity in the sinus lining was repaired with a collagen membrane. Postoperative healing was uneventful, and histopathological analysis confirmed the diagnosis of complex odontoma. The patient was subsequently rehabilitated to restore masticatory function and maintain occlusal stability. This case emphasizes the significance of timely diagnosis, meticulous surgical intervention, and interdisciplinary management in treating large odontomas involving the maxillary sinus.

Index Terms - Complex odontoma1, Maxillary sinus2, Impacted tooth3, Surgical excision4, piecemeal approach5

1. INTRODUCTION

Odontomas represent the most common odontogenic “hamartomas,” yet their anatomic behavior varies widely; complex variants in the posterior maxilla are disproportionately challenging because the thin antral floor and juxtaposition of the infra-orbital bundle leave little margin for surgical error.[1] Although many the swelling may go unnoticed for years, progressive expansion can compromise the ostiomeatal unit, favoring chronic maxillary sinusitis, oro-antral fistula formation, or even obstructive sleep sequelae.[2] Radiographically,

a complex odontoma displays a disorganized radiopaque mass rimmed by a radiolucent halo, but three-dimensional imaging is mandatory to delineate its intimate relationship to the sinus walls, adjacent molar roots, and the greater palatine neurovascular bundle.[3]

The therapeutic goal extends beyond mere removal of the calcified lesion; surgeons must simultaneously preserve sinus physiology, maintain alveolar ridge volume for future implant-borne rehabilitation, and minimize neurosensory deficits. Contemporary approaches therefore integrate endoscope-assisted Caldwell-Luc corridors, piezoelectric bone surgery, and, when indicated, concurrent sinus-floor augmentation with xenograft or platelet-rich fibrin to accelerate mucosal regeneration.[4] Early referral to oral and maxillofacial surgery teams is critical, as delayed intervention correlates with increased risk of Schneiderian membrane perforation, prolonged intra-sinus inflammation, and lower implant survival.[5]

In this case report, we provide the surgical management of complex posterior-maxillary odontomas encroaching upon the maxillary sinus, explore adjunctive grafting strategies, and outline postoperative surveillance aimed at preventing recurrence and restoring optimal oro-antral function.

2. CASE REPORT

A 14-year-old male reported to the Outpatient department with the complaint of proclined maxillary anteriors, on radiological examination with orthopantomograph and lateral cephalogram a large radiopaque lesion was reported in the right posterior maxillary region of the jaw with 17 impacted in the maxillary sinus. On examination there was a very slight buccal cortical plate expansion of the right buccal cortical plate, along with missing 17. The swelling was non compressible, non-tender, without any well-defined borders, soft tissue covering the swelling was normal. Further there was no significant lymphadenopathy.

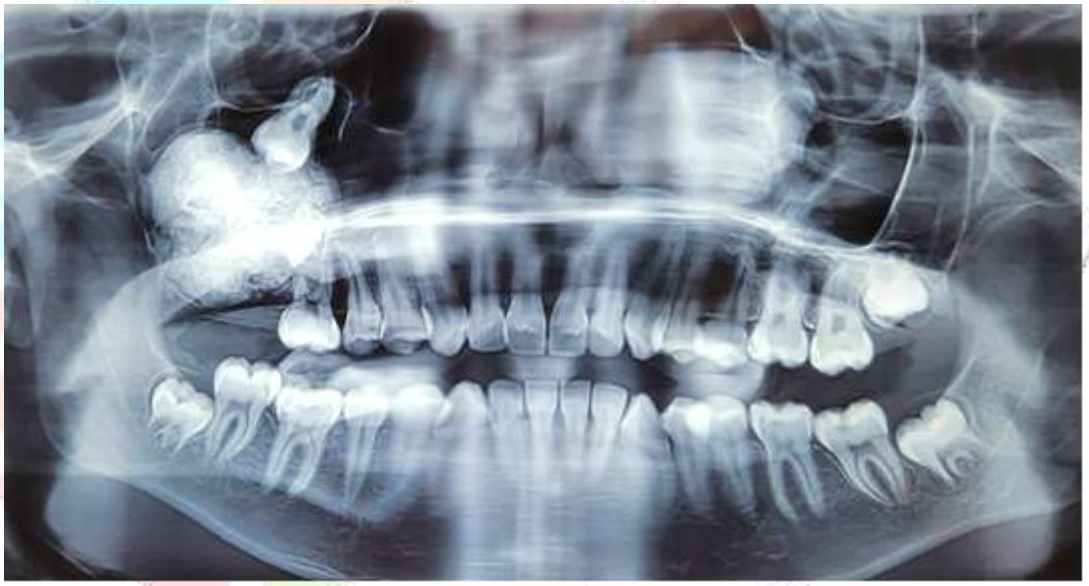

Figure 1-1 Preoperative Orthopantomograph

Figure 1-2 Preoperative Cephalogram

Figure 1-3 Complex Maxillary Odontome exposed

Figure 1-4 Enucleation with piecemeal approach

Figure 1-5 Closure with 3-0 Mersilk

On CBCT examination shows evidence of well-defined, inhomogeneous, radio-opaque mass surrounded by thin radiolucent halo seen w r t right posterior maxillary region from distal of #16 till the posterior border of maxillary tuberosity, Supero-inferiorly it is extending from alveolar crest till the floor of maxillary sinus with effacement of floor maxillary sinus is seen, measuring approximately 33.5mm supero-inferiorly, 33.6mm mesiodistally and 25.4mm Bucco-palatally in dimensions respectively. E/o Expansion and thinning of buccal and palatal cortical plate is noted. Superior displacement of #17 in close approximation w r t floor of maxillary sinus and lateral wall of nasal cavity. A provisional diagnosis of complex maxillary odontoma was made.

Undre General Anesthesia the surgery was planned. A crevicular incision was placed with mesial releasing incision anterior to 14 and crestal distal releasing incision was given distal to 16, Full thickness mucoperiosteal flap was reflected, bone shaving was done superior and distal to 16 to expose the odontoma, on exposure the odontoma was removed with a piecemeal technique due to the bulk of the lesion and locking with radicular region of 16. After the odontoma was removed, 17 was exposed impacted in maxillary sinus lining, 17 was extracted, a 0.5 into 0.5 cm discontinuity was noted in sinus lining which was closed using collagen sheet. Closure was done using 3-0 round body vicryl suture with horizontal mattress suture in the posterior region and simple interrupted in the interdental region. Postoperatively Ryle's tube was placed, no signs of nasal discharge was noted indicating for any sinus communication. 3 months after the surgery no complications were evident. Histopathologically the decalcified section showed haphazard arrangement of dentin and cementum with numerous pulp spaces confirming the diagnosis as complex odontoma. Patient has been rehabilitated with a removable partial denture replacing the second molar (4c) to facilitate masticatory function and also to prevent supra eruption of opposing lower molar teeth.

Post-operative Considerations- Short course of broad-spectrum antibiotics (amoxicillin-clavulanate 625 mg TID for 5–7 days) was advised. Decongestants, and avoidance of nose-blowing reduce risk of oro-antral fistula. Serial endoscopy or CBCT at 6 months and annually for 2 years detects mucosal remodeling or rare recurrence (<2 %)

3. DISCUSSION

Complex odontomas are hamartomatous malformations composed of disorganized dental hard tissues; when they reach substantial size or occupy anatomically constrained sites such as the maxillary sinus, they become symptomatic and mandate surgical removal. The present case adds to the limited literature describing posterior - maxillary complex odontomas breaching the sinus cavity and highlights diagnostic pitfalls and management nuances. Odontomas are one of the most common odontogenic tumors accounting for 22 – 67 % of odontogenic lesions in large series6.

Complex variants (irregular calcified mass without tooth-like structures) constitute ~20–30 % and preferentially occur in the posterior jaws, predominantly the mandible; maxillary sinus involvement is distinctly uncommon7.They arise from aberrant proliferation of both epithelial and mesenchymal components of the tooth germ, possibly triggered by local trauma, infection, or genetic factors such as APC or RUNX2 dysregulation8.Patients often remain asymptomatic until the lesion enlarges enough to obstruct the osteomeatal complex, producing facial heaviness, recurrent sinusitis, or infra-orbital pain9.

Panoramic imaging may underestimate superior extension; cone-beam CT (CBCT) or multidetector CT precisely delineates corticated borders, internal density equal to enamel/dentin, and relationship to sinus walls, aiding surgical planning 10.

Differential Diagnosis can include various radiopacities occupying the maxillary like Cemento-ossifying fibroma, Fibrous dysplasia (ground-glass), Antrolith or fungal ball, Intrapolyp calcification and Osteoma. Careful analysis of internal structure and a peripheral radiolucent halo favour odontoma; histopathology remains definitive11.

Therapeutic Rationale 1. Consensus guidelines (AAOMS 2020) recommend complete excision because residual epithelial islands risk secondary cystic transformation (e.g., dentigerous or calcifying odontogenic cyst) and recurrent sinus obstruction. 2. En-bloc trans-oral (Caldwell‐Luc) or endoscopic endonasal approaches are described. The combined technique used here minimized facial scarring, allowed direct visualization of sinus mucosa, and facilitated simultaneous antrostomy. 3. Curettage alone may suffice for small lesions; however, lesions >2 cm, multilobulated, or intimately adherent to sinus walls are better managed by block removal to avoid fragmentation and incomplete clearance12.

Limitations and Future Directions -Lack of genetic analysis precludes comment on syndromic associations (e.g., Gardner syndrome). Long-term (>5 year) follow-up data will better clarify recurrence risk in sinus-based odontomas. Emerging navigational endoscopic techniques may further decrease morbidity; prospective comparative studies are warranted.

A complex odontoma invading the maxillary sinus, although benign, can substantially impair sinonasal function. High-resolution imaging followed by complete en-bloc excision restores sinus physiology and prevents secondary complications. Clinicians should maintain a high index of suspicion for odontogenic lesions in unilateral chronic sinus disease unresponsive to medical therapy.

4. CONCLUSION

This case highlights the importance of thorough clinical and radiographic evaluation in diagnosing rare, large complex odontomas in the posterior maxilla, particularly when they extend into the maxillary sinus and involve adjacent teeth. Early detection and appropriate surgical planning allowed for complete removal of the lesion, preservation of surrounding structures, and successful closure of the sinus lining without postoperative complications. Histopathological confirmation ensured diagnostic accuracy, and timely prosthetic rehabilitation restored functional efficiency and prevented occlusal disturbances. Such comprehensive management underscores the need for multidisciplinary coordination to achieve optimal outcomes in similar presentations.

5. ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

6. HUMAN AND ANIMAL RIGHTS

No Animals/Humans were used for studies that are base of this research.

7. CONSENT FOR PUBLICATION

Not applicable.

8. CONFLICT OF INTEREST

The editor declares no conflict of interest, financial or otherwise.

9. ACKNOWLEDGEMENTS

Declared none.

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