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SURGICAL APPROACH IN THE TREATMENT OF A LARGE RADICULAR CYST WITH PROMINENCE TOWARDS THE MAXILLARY SINUS

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Abstract

A cyst is defined as an epithelial lined pathologic cavity that may contain fluid or a semisolid material. The radicular cyst is an inflammatory odontogenic cyst seen at the root apex of dead pulp. These cysts are most common among other odontogenic cyst, may be because of high incidence of pulpal pathology in the oral cavity. Rarely the cyst can grow slowly to larger size causing destruction of adjacent vital structures.

The aim of this paper is to present the surgical management of a large radicular cyst communicating with the maxillary sinus. This paper describes a case of a 42-year-old woman, where a radicular cyst was diagnosed clinically and radiographically.

During the intervention, in addition to the removal of the cyst in toto, a sinus plasty was also performed, due to the prominence of the cyst in the maxillary sinus.

The treatment of large radicular cysts is a problem that requires a serious approach in diagnostics, planning and performing the treatment. Pathohistological analysis is key in the correct diagnosis of odontogenic cysts.

Key words: radicular cyst, maxillary sinus, sinus plasty, pathohystology.

Introduction

A cyst is defined as an epithelial lined pathologic cavity that may contain fluid or a semisolid material. They are classified as Odontogenic from remnants of enamel epithelium, Non-odontogenic cyst from lines of fusion and Pseudocysts which are nonepithelial and lined only by connective tissue. [1].

The radicular cyst is an inflammatory odontogenic cyst seen at the root apex of dead pulp. These cysts are most common among other odontogenic cyst, may be because of high incidence of pulpal pathology in the oral cavity. On intra oral examination, it will be caused due to carious tooth or previous improperly restored tooth or traumatised teeth or seen in root canal failure cases. [2].

In the studies of Rajendran et al. and Quadri et al. they are classified as bay or apical according to how the root canal connects to the epithelial cavity. A bay cyst is a cavity of cysts with epithelial linings that opens to the root canal. Because it resembles the marginal periodontal pocket, it is commonly known as a "periapical pocket cyst". Apical cysts have full epithelialization but do not open into the apical foramen or root canal. Currently, it is known as a radicular cyst or a true cyst [3,4].

Most of the radicular cyst do not show any clinical symptoms and are discovered only when periapical radiograph is taken of these nonvital teeth. Patients often complain of slowly enlarging swellings.9 Radiographically, most radicular cyst appears as round or pear-shaped unilocular radiolucent lesion in the periapical region. The cyst may displace adjacent teeth or cause mild root resorption.10.

The treatment choices for cysts vary based on their size and location. Endodontic therapy with surgical enucleation is recommended for long-standing chronic lesions; however, nonsurgical care for minor lesions can also be advocated, or surgical treatment, like enucleation, marsupialization, or decompression, when lesion is large[5,6,7].

Early detection and treatment of odontogenic cyst lesions is crucial to reduce morbidity. The treatment of dentigerous cysts located within the sinus highlights the necessity of interdisciplinary collaboration among various dental specialties, oral surgeons, and otolaryngologists[8].

The selection of surgical intervention should be tailored to individual cases with the primary objective of complete excision of the cyst and its contents, noting the importance of verifying whether the natural communication between the sinus and nose is patent or compromised. Every surgeon must send excised tissue or cystic specimens for histopathological examination, which is crucial for establishing an accurate diagnosis [9].

The aim of this paper is to present the surgical management of a large radicular cyst communicating with the maxillary sinus.

CASE REPORT

A 43-year-old patient came to the Clinic of Oral Surgery in January 2025 with pain and swelling in the projection of tooth 27. In the last 2 years, the patient had swolling exclusively intraorally several times but it spontaneously resolved. After the first swelling, she received the oral antibiotic Cephalexin perorally, after which the swelling subsided. On clinical examination, there was swelling and visible asymmetry of the face extraorally, and periapical redness was observed intraorally. During the palpation, a tumefaction was painful. During the percussion of the suspected tooth, there was also painful sensitivity. (Figure 1) In the remaining teeth, there are several roots that need extraction.

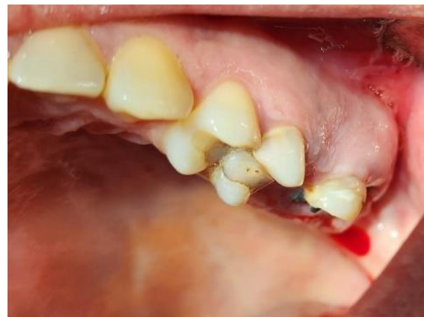
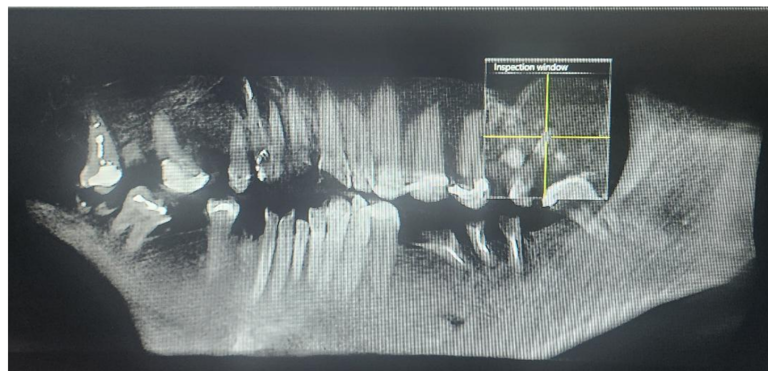
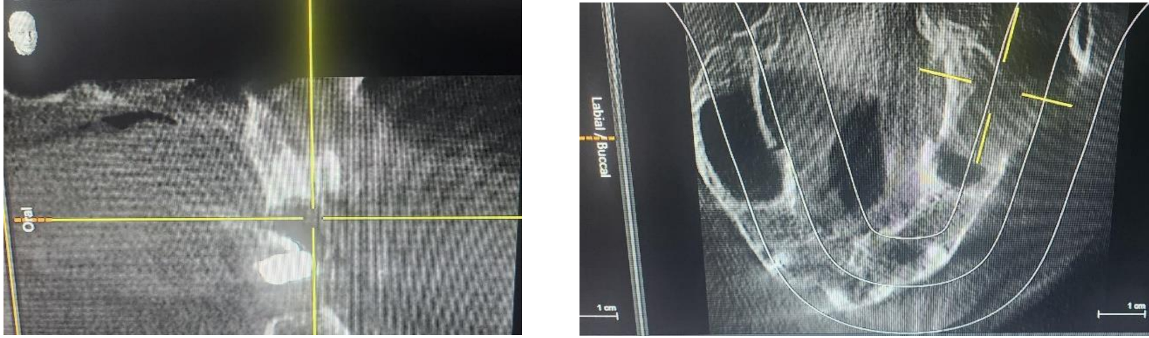


Figure 1. Intraoral finding

CBCT was used as an auxiliary diagnostic tool to confirm the diagnosis. The image showed a solid round formation limited by an osteosclerotic ring in which the roots of the second molar in the upper left maxilla protrude. The same formation protrudes into the maxillary sinus in all three directions (longitudinal, sagittal and transverse), (Figures 2,3,4,5).





Figures 2,3,4.5 CBCT

Due to the exacerbation of the process, it was prescribed to the patient Amoxiclave a 1000 mg, every 12 hours, during 10 days. After the acute condition subsided, the patient was scheduled for oral surgical intervention. The patient has no previous illnesses and does not receive any therapy except occasionally vitamin supplements and she is not a smoker.

Surgical intervention was performed under local anesthesia, using 4% anesthetic septanest. First of all, tooth extraction of 26 was planed,. Due to destruction of the crown, the tooth fractured during an attempted extraction.

A mucoperiosteal flap was raised with a ridge incision and mesial and distal relaxation. The mesial and distal relaxation were performed with greater divergence due to the possibility of opening the maxillary sinus, so that sinus plastic could be performed if necessary. (Figure 6)

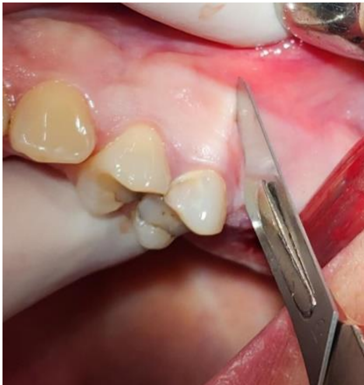


Figure 6. Incision

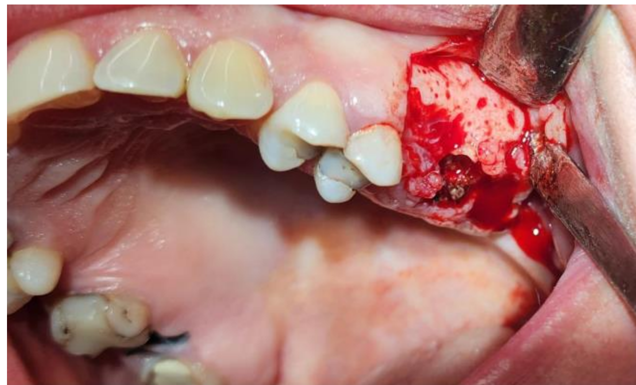


Figure 7. Mucoperiostal flap

After raising the mucoperiosteal flap the osteotomy was made, and tooth 27 was extracted. After the extraction, the cyst was exposed and its enucleation in toto was made. Since the cyst was in communication with the maxillary sinus, after its enucleation, an oroantral communication occurred. (Figures 7,8,9,10,11)

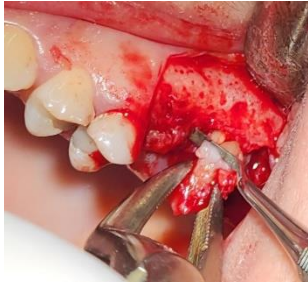


Figure 8. Osteothomy and tooth extraction

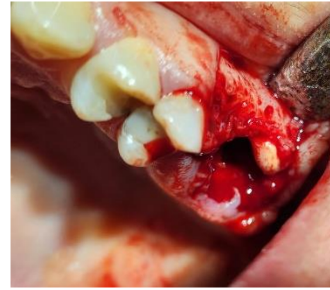


Figure 9. Cyst exposure

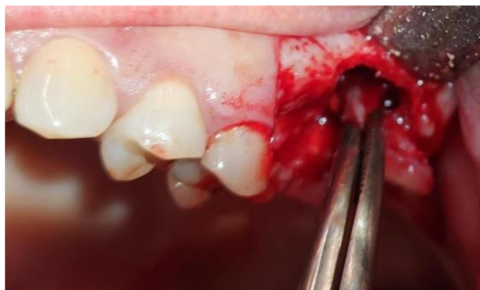


Figure 10. Cyst enucleation

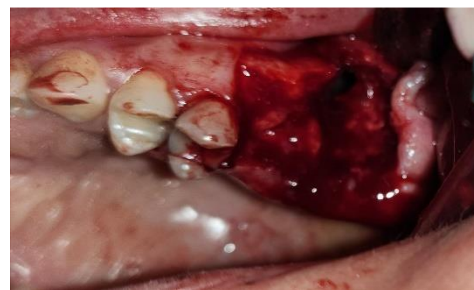


Figure 11. Oroantral communication

This led to the need for deperiostealization and relaxation of the mucoperiosteal flap (to be tension-free) and after that a sinus plastic intervention was made, which closed the oroantral communication. The suturing was done with silk suture 3.0.

The cyst was placed in a syringe filled with saline and sent for histopathological analysis. (Figures 12,13).

Microscopically, the cyst wall is composed of loose connective tissue infiltrated with a mixed, predominantly polymorphonuclear inflammatory infiltrate and several calcified bone spurs. Only in one part the cyst is lined with squamous epithelium. (Figure 15)

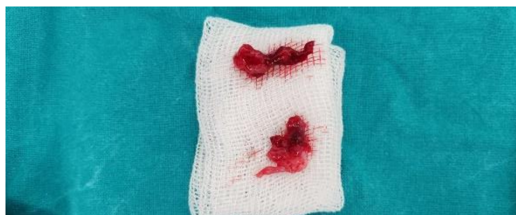


Figure 12 and 13. Prepared material for pathohystology

Figure 14. Pathohystological findings

The patient was advised to apply ice (to prevent further swelling postoperatively), not to blow his nose, not to bend over excessively, and not to lift heavy objects or perform any strenuous physical work. An antibiotic was prescribed, Amp. Lincomycin 600 ng every 12h x 1, for 5 days, followed by Caps.Clindamycin 300 mg, 8x1 daily for the next 5 days. He was also prescribed to put Gutt. Citeral in each nostril for 7 days.

On the first postoperative day, the patient had a small swelling, and the patient reported feeling a slight discharge into the pharynx and had a small nosebleed. At the check-ups on the second and seventh postoperative days, the patient did not complain of pain or any discharge into the mouth and pharynx. The suture was removed 10 days after the intervention.

After 3 months we had complete consolidation of the bone and gingival tissue. (Figure 15)

Figure 15. 3 months follow up

Discussion

Radicular cysts are the most common in tooth bearing area and they are generally smaller in size seen at the apex of the dead tooth. But rarely it can grow slowly to larger size causing destruction of adjacent vital structures. In the article report of Anusha was shown a rare case of radicular cyst involving the maxillary sinus, eroding the orbital floor and encroaching the nasal septum and hard palate[10].

In the case of Nilesh K, Dadhich A a radicular cysts as a inflammatory odontogenic cyst, was typically presents as small radiolucent lesion around root apex of one or more teeth.

The air-filled sinus and its thin walls provide less resistance to cyst growth, allowing it to considerably increase in size before they become symptomatic and are clinically noted. Such large radicular cyst though infrequently reported, should be included in the differential diagnosis of extrinsic maxillary sinus cyst [11].

In the case of Gurav et al, the lesion was developed as a result of trauma.[12].

The clinical case of Nalini et al. was managed successfully by endodontic therapy followed by surgery. The surgical enucleation of the cyst has been carried out under general anesthesiaa and strict asepsis through an intraoral approach.[13].

Total removal of the cystic membrane is essential to prevent the recurrence of the lesion, which was the probable cause of relapse in the case of Velasco I et al.

Also it allows a complete histopathological examination. Radicular cysts should be considered in the differential diagnosis of large maxillary sinus lesions and never be discarded until histopathology is available [14].

The study of Stojanova et al. shows the association between the presence of the local cystic lesion and the systemic immune response of the body by verifying the changes of the levels of immunoglobulins in the serum of patients before and one month after surgical therapy [15].

Conclusion

The treatment of large radicular cysts is a problem that requires a serious approach in diagnostics, planning and performing the treatment. Pathohistological analysis is key in the correct diagnosis of odontogenic cysts.

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