

The Treatment For Radicular Cysts Involves Complete Resection And Immediate Reconstruction Using Rib Bone Grafting: A Case Report

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Abstract

Radicular cysts are the most common cystic lesions affecting the jaws which arise from the epithelial residues in the periodontal ligament as a result of inflammation. They generally result due to pulpal infection following dental caries. Due to destructive growth characteristics of radicular cyst during the intraosseous stage, they appear to reach considerable size, then the treatment often requires complete enucleation and skeletal reconstruction. Here we present the case of a 19-year-old male patient who came to our department, because of a huge, bulging mass in his right cheek region. Surgery consisted of complete removal of the cyst and immediate reconstruction of the midfacial buttress using an autologous rib graft. This case underscores the nature of the frequently asymptomatic and long-term evolution of maxillary radicular cysts, with their growth causing massive bone destruction for which skeletal reconstruction is required.

Keywords: Maxillary Radicular cyst, Maxillary Reconstruction, Rib bone graft.

INTRODUCTION

Radicular cyst is most common type of cyst among various types of odontogenic cyst. It is common inflammatory jaw cystic lesions that occurs infected and necrotic in the teeth pulps. Radicular cyst causes slowly progressive painless swelling with no symptoms until they become large. It is mostly unnoticeable, until detected by routine radiographs and histopathological examination. In radiographic image radicular cyst appears as round oval unilocular radiolucent with radiopaque sclerotic margins.¹ Among the methods of treating this type of cysts, it is preferable to marsupialization followed by enucleation of the lesions and immediate reconstruction of defect.

The defects of maxilla due to this type of large cystic lesion affect the functions of speech,

swallowing and mastication and also cause cosmetic disfigurement. Redemption for this defect requires surgical reconstruction but reconstruction of this defect remains a significant challenge, because the three-dimensional architecture of the midface serves both functional and aesthetic roles². Preoperative planning is the most important step in the reconstruction of maxillofacial defect. Autogenous grafts are the most gold standard in bone grafting which are planned according to the size, shape and location of defect. In this instance, our chosen course of action involves addressing the treat maxillary defect by employing costochondral grafting, as necessitated by the characteristics of the defect^{2,3,4}.

CASE REPORT

A 19-year-old male patient reported to the Department of Oral and Maxillofacial Surgery with complaining of swelling and pain in the right facial area for a month. Patient was with no history of systemic conditions. Patient didn't give history of trauma. In clinical examination, the right cheek area has approx. 8×10 cm, non-tender, hard and immobile in nature, causing slight

facial asymmetry. There was an extended area palpated on intraoral examination on the right upper buccal gingival sulcus area. From the right premolar to the left canine in the alveolar process, panoramic radiography revealed a circular process (denser than air) with a sclerotic border and radiolucency with a partially sclerotic border. Computed tomographic scans were carried out to more clearly define the lesion's extent. The right maxillary sinus was nearly entirely occupied by a massive cystic lesion that

measured around 7.7×9.5 cm. The mass had undermined or completely destroyed the front wall of the maxilla, and the thin bone structure displaced the zygomatic buttress in some places.

During surgery, the cyst was completely enucleated, and the zygomatic and nasofrontal buttresses were rebuilt using autologous bone.^{6,7,8}

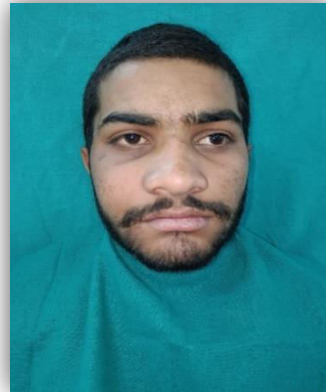
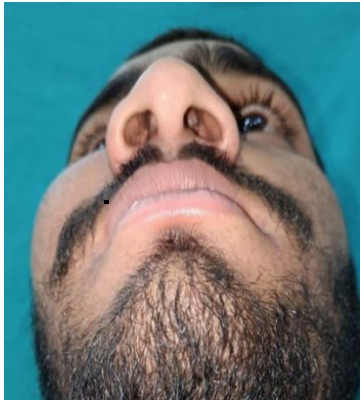


Fig. 1 Apreoperative clinical photograph showing hard swelling on his right cheek region

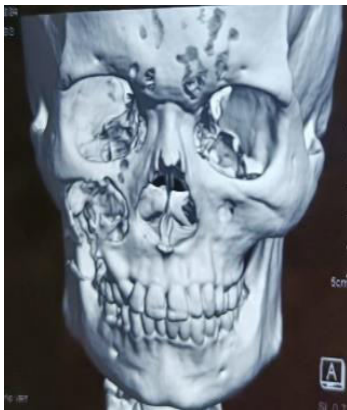


Fig.2 Computed tomographic images showing high-density cystic lesion without contrast enhancement. The thinned anterior wall of the maxillary sinus and zygomatic buttress resulted from bony remodelling



Fig. 3 Panoramic radiograph showing a well-defined radiolucent lesion in the right maxilla.

SURGICAL PROCEDURE

Patient was taken for the surgery, where general anaesthesia was administered along with endotracheal intubation. Weber–Fergusson’s incision was made. Flap was reflected through subperiosteal dissection to expose the cyst and the right maxilla.⁷ The mucosa of the maxillary sinus was intact after the enucleation of cyst. A bone graft from the sixth rib was harvested for the repair of the maxillary sinus deformity. The rib bone graft was contoured to match the deformity and affixed on the deformity location using titanium miniplates. After the flap was corrected and the incision closed with a 3/0 monofilament absorbable suture, a little silastic drain was left. Antibiotics and analgesics were given in the postoperative period and continued until postoperative day 5. The drain was removed 5 days after the surgery.



Fig.4 complete resection of the cyst



Fig 5The bone is carved for fit.

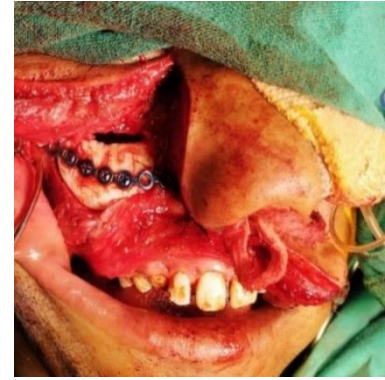


Fig. 6 Titanium miniplate was used for stabilisation of bone graft in maxillary buttress.



Fig. 7 Post Operative Radiograph showing the reconstructed zygomatic buttress

DISCUSSION

Radicular cysts are the most common of all lesions and account for more than 50% of all odontogenic cysts. They are usually associated with decayed, non-vital, discoloured or broken teeth and Two main groups were identified for odontogenic cysts. RCs that form during tooth pulpal necrosis and are induced by inflammation make up the first group. Developmentally derived keratocytes and

are mostly found at the apices of teeth. Radicular cysts cause a gradually increasing painless swelling. There are no symptoms until they grow. The swelling can become painful and grow rapidly if it is infected

dentigerous cysts make up the second type of lesions. Several treatment modalities are available for radicular cysts including endodontic treatment, extraction of the offending tooth, and enucleation.

The cyst's size, location, bone integrity, and proximity to critical structures all affect the appropriate course of treatment. So, we have to plan for marsupialization followed by enucleation. Marsupialization relieves the internal pressure of the cyst, thus inducing the contraction of the cystic lining. The midface which consists of a network of sinuses and some thicker areas (or buttresses), provides strong structural support. These areas are the main supporting structure of the face and anatomical reconstruction of these structures is necessary to restore the facial bone architecture. Supports are the mid face and the cornerstone and they protect against external trauma and preserve facial shapes aesthetically, accompanying facial fractures require surgery. In our case, costochondral transplantation is used to restore facial contours. Costochondral grafts continue to be very popular in the treatment of facial defects. This harvesting technique has been and continues to be useful in dealing with many defects and reconstructive needs. Most minor deformities are usually repaired with conchal or septal cartilage. When a significant amount of material is required for facial reconstruction, rib grafting is considered a versatile and attractive option.⁹ Costal cartilage grafts can be used in facial reconstruction surgery to repair facial defects resulting from trauma, cyst, cancer surgery or congenital anomalies. Cartilage can be used to support and reconstruct the damaged area and can be shaped and sized to fit the specific needs of the patient.¹⁰

CONCLUSION

The current example exemplifies how damaging radicular cysts may be. This example demonstrates the long-term, frequently asymptomatic evolution of maxillary radicular cysts and how their increasing size results in significant bone damage that necessitates skeletal restoration. Additionally, it's crucial to repair the stable buttress of the maxilla by autologous rib grafting after the lesion has been completely removed in order to retain the form and function of the midface in cases where a major cystic lesion has affected the supporting bony structure.

REFERENCES

1. Gadiant SE, Cina MT, Ford CN. Large radicular cyst in the maxillary sinus. *The Journal of the Wisconsin Dental Association*. 1976 Oct 1;52(10):468-9.
2. Hahn HM, Lee YJ, Park DH. Huge radicular cyst of the maxilla treated with complete resection and immediate reconstruction by

- rib bone graft. *Journal of maxillofacial and oral surgery*. 2019 Sep 6;18:378-81.
3. Kim SW, Lee YW, Kim JT, Kim YH. Reconstruction of a maxillary defect using the remnant bone of mandibular angle ostectomy. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2012 Jul 1;65(7):e189-92.
4. Meazzini MC, Battista VM, Brusati R, Mazzoleni F, Biglioli F, Autelitano L. Costochondral graft in growing patients with hemifacial microsomia case series: Long-term results compared with non-treated patients. *Orthodontics & Craniofacial Research*. 2020 Nov;23(4):479-85.
5. Abdel-Haleem AK, Nouby R, Taghian M. The use of the rib grafts in head and neck reconstruction. *Egyptian Journal of Ear, Nose, Throat and Allied Sciences*. 2011 Jul 1;12(2):89-98.
6. Joshi NS, Sujan SG, Rachappa MM (2011) An unusual case report of bilateral mandibular radicular cysts. *Contemp Clin Dent* 2:59
7. Pinto MD, Rocha FL, Cupello VB, Braz GG, Santos RG, Pires RF. A rare case report in maxillary sinus with Weber-Ferguson approach. *Oral health case Rep*. 2018;4:141.
8. Neville BW, Damm DD, Allen CM, Bouquet JE. *Oral and Maxillofacial Pathology*. 3rd Edition, 2009, Saunders Elsevier: 130-131.
9. Tsai CH, Weng SF, Yang LC, Huang FM, Chen YJ, Chang YC. Immunohistochemical localization of tissue-type plasminogen activator and type I plasminogen activator inhibitor in radicular cysts. *J Oral Pathol Med* 2004;33(3):156-161.
10. García CC, Sempere FV, Diago MP, Bowen EM. The post-endodontic periapical lesion: histologic and etiopathogenic aspects *Med Oral Patol Oral Cir Bucal* 2007; 1;12(8):E585-590.
11. Elsalanty ME, Genecov DG. Bone grafts in craniofacial surgery. *Craniofacial trauma & reconstruction*. 2009 Oct;2(3-4):125-34.
12. Committeri U, Arena A, Carraturo E, Barone S, Salzano G, Mariniello D, De Riu G, Vaira LA, Giovacchini F, Califano L, Piombino P. Minimally Invasive Harvesting Technique for Costal Cartilage Graft: Donor Site, Morbidity and Aesthetic Outcomes. *Journal of Clinical Medicine*. 2023 May 12;12(10):3424.
13. Horgan JE, Padwa BL, LaBrie RA, et al: OMENS-Plus: Analysis of craniofacial and extracraniofacial anomalies in hemifacial microsomia. *Cleft Palate Craniofac J* 32:405, 1995

14. Lakshmanan S, Roychoudhury A, Bhutia O, Yadav R, Bhatt K, Pandey RM. Can costochondral grafts fulfil ramus-condyle unit reconstruction goals in children with temporomandibular joint ankylosis?. *British Journal of Oral and Maxillofacial Surgery*. 2021 Feb 1;59(2):184-90.
15. Perrott DH, Umeda II, Kaban LB: Costochondral graft construction/reconstruction of the ramus/condyle unit: Long-term followup. *J Oral Maxillofac Surg* 23:321, 1994 16. Figueroa AA, Gans BJ, Pruzansky S: Long-term