CASE REPORTS

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Decompression as an effective primary approach to large radicular cyst in the maxillary sinus – A case report

Dekompresija kao delotvorni primarni pristup radikularnoj cisti u maksilarnom sinusu

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Abstract

Introduction. Therapeutic approach to jaw cysts may depend on their dimensions and localization. Enucleation of cystic lesion is not always preferable in the first act, especially if large cysts are in close proximity to important anatomical structures. The aim of this paper was to present the outcome of the treatment protocol comprising preoperative decompression and subsequent enucleation of a large maxillary cyst. **Case report.** A 21-year-old male patient with large asymptomatic radicular cyst in the right maxillary sinus was presented to our clinic. Cone-beam computed tomography (CBCT) showed a large cyst, which perforated the right anterior maxillary wall by 1.5 cm, and was in the intimate contact with the orbital floor. Surgical treatment of the cystic lesion comprised: preoperative decompression with biopsy in the first act and enucleation, performed under general anesthesia, 6 months after the observation period. **Conclusion.** Decompression with subsequent enucleation proved to be effective treatment of large radicular cyst in maxillary sinus with low-morbidity.

Key words:
maxillary sinus; radicular cyst; cone-beam computed tomography; oral surgical procedures; treatment outcome.

Apstrakt

Uvod. Terapijski pristup cistama vilice može zavisiti od njihovih dimenzija i lokalizacije. Enukleacija cistične lezije često nije pogodna u prvom aktu ako se velika cista nalazi u blizini važnih anatomskih struktura. Cilj ovog rada bio je da se prikaže ishod lečenja velike ciste u maksilarnom sinusu koji je podrazumevao preoperativnu dekompresiju i odloženu enukleaciju. **Prikaz bolesnika.** Prikazan je bolesnik, star 21 godinu, sa velikom, asimptomatskom, radikularnom cistom u maksilarnom sinusu. Radiografska dijagnostika pomoću *cone-beam* kompjuterizovane tomografije (CBCT), pokazala je prisustvo velike cistične lezije koja je probila prednji maksilarni zid (1,5 cm) i bila u bliskom kontaktu sa podom orbite. Hirurški tretman cistične lezije uključio je preoperativnu dekompresiju i biopsiju u prvom aktu i enukleaciju u opštoj anesteziji nakon 6 meseci. **Zaključak.** Dekompresija i odložena enukleacija pokazale su se efikasnim terapijskim pristupom kod lečenje velike radikularne ciste maksilarnog sinusa uz mali morbiditet.

Ključne reči:
maksilarni sinus; cista, radikularna; kompjuterizovana tomografija konusnog zraka; hirurgija, oralna, procedure; lečenje, ishod.

Introduction

Radicular cysts are the most common odontogenic inflammatory jaw cysts. The remnants of Malassez epithelium in combination with intracanal infection as an initial stimulus are necessary for radicular cysts development [1]. The main feature of cystic lesion is its constant growth, with bone resorption and displacement of surrounding structures [2]. The growth of a cyst is slow, and may develop without any symptoms, so it may reach impressive dimensions.

Treatment of radicular cysts is mainly surgical. However, in some strictly selected cases, there are still open questions

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about radicalism in surgical approach in order to preempt probable postoperative complications and morbidity. Therefore, the therapeutic approach to cyst treatment sometimes depends on their dimensions and localization. Enucleation of a cystic is not always possible in the first act, especially when large cysts are in close proximity to important anatomical structures [3]. Therefore, in order to avoid anatomical structures damage, the conservative method involving decompression with subsequent enucleation might be preferabble [4,5]. Decompression of a cyst comprises making a small opening in the cyst keeping it open with a drain [3,6]. Decompression has to stop cystic growth by eliminating inflammation and intracystic pressure, to allow thickening of the cystic wall and to reduce cyst size for easier removal in the second stage.

We presented a patient with a large maxillary cyst treated by preoperative decompression and subsequent enucleation.

Case report

A 21-year-old healthy male patient came to the Clinic of Oral Surgery, Faculty of Dental Medicine in Belgrade, complaining of swelling in the right maxillary vestibule. Clinical examination confirmed the complaint and the painless swelling was noticed in the region of the right maxillary vestibule from the right upper canine to the third molar (region 13 to 18). No local signs of infection were seen. Dupuytren's phenomenon and fluctuation were present on palpation. Ortopantomogram (OPG) showed large cystic lesion in the right maxillary sinus, 8–10 cm in diameter, with clearly defined borders, comprising the region 13–18. On the Water's projection, the whole lumen of the right maxillary sinus was embedded with the cystic lesion. Additional radiographic procedure, which included cone-beam computed tomography (CBCT) showed a large cyst perforating the right anterior maxillary wall by 1.5 cm: the cyst was in intimate contact with the orbital floor (Figure 1). Furthermore, the cyst was also in close contact with the content of the pterygopalatine fossa in posterior aspect and with the content of the infraorbital canal in the frontal aspect (Figure 1).

On the basis of clinical characteristics and radiological findings, the treatment plan included the following:

Stage one: *Decompression and biopsy*

Cystic lesion decompression and biopsy were performed in local anesthesia (4% articaine with 1:100 000 epinephrine; Septanest®, Septodont, France). The mucoperiosteal flap was raised and one part of the cyst excised and sent for histopathological analysis. In addition, tooth 14 was extracted and the slight re-

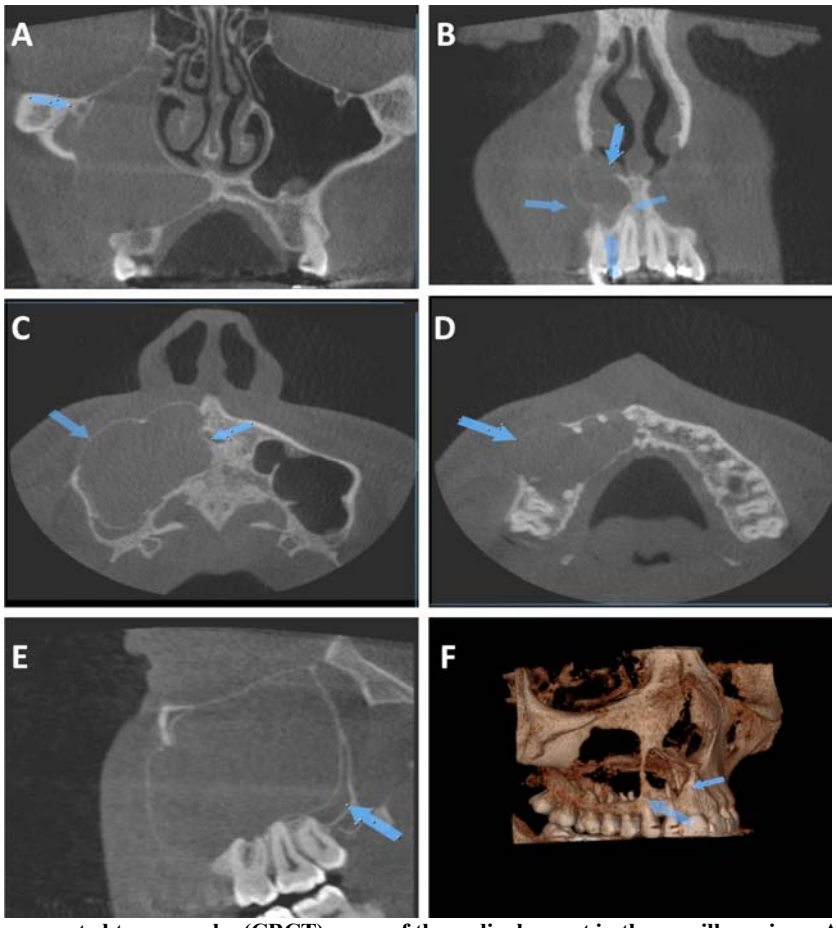

Fig. 1 – Cone-beam computed tomography (CBCT) scans of the radicular cyst in the maxillary sinus. A) The coronal view clearly shows the right maxillary sinus filled with cyst in the proximity to the infraorbital canal and the floor of the orbit; B) The coronal view shows growth of the cyst to the region of tooth 12; C) The axial view clearly shows the cystic lesion in the maxillary sinus, with thinning and perforation of the cortical plate on the medial aspect of the maxilla; D) The axial view clearly shows alveolar process of the maxilla deformity; E) The sagittal view of the maxilla shows the expansive lesion with posterior growth in the maxillary tuber; F) The 3D image of the affected site shows ovoid destruction of the bone.

sorption of its roots was observed. A drainage tube was placed in the socket of the tooth 14 and cyst rinsed with saline three times per week in the following 6 months. There was no infection during that period.

Histopathological finding

The multilayered squamous epithelium with the signs of parakeratosis was observed by histopathological analysis of the sample. There was granulation tissue proliferation with inflammatory infiltration of polymorphonuclear leukocytes beneath the epithelium. Histopathological analysis confirmed the diagnosis of radicular maxillary cyst.

Stage two: *Enucleation*

CBCT control 6 months thereafter showed the cystic lesion significantly reduced and the cystic wall thickened (Figure 2). The teeth 15, 16 and 17 were devitalized prior the surgery. The operative procedure to remove the cystic lesion was performed under general anesthesia. All the necessary laboratory analyses prior to general anesthesia were done at the Pharmacological Laboratory, Faculty of Dental Medicine. To enucleate the cyst, we made incision after the Wassmund-Rerhman's procedure. The incision encompassed region from the tooth 13–18. After raising mucoperiosteal flap, we noticed that the cyst 1.5 cm in diameter resorbed the maxilla in the premolar region, on the vestibular side. This opening was extended by a drill and served to approach the cystic lesion. Another trephination in the region 13 was made to make enucleation easier. After curettage, the lumen of the defect was rinsed with saline to enable the sight of the cystic wall remnants. Peripheral ostectomy was performed and the overlying attached to mucosa was excised. The cystic wall and specimens of the adjacent bone were sent for histopathological analysis. The sinus cavity and cystic defect which remained after enucleation were merged into one cavity. The defect was buffered with iodoform gauze, which was pulled through the drainage canal in the vestibule of the opposite side. The mucoperiosteal flap was relaxed after periosteum incision and than sutured with horizontal mattress sutures to the palatal mucosa.

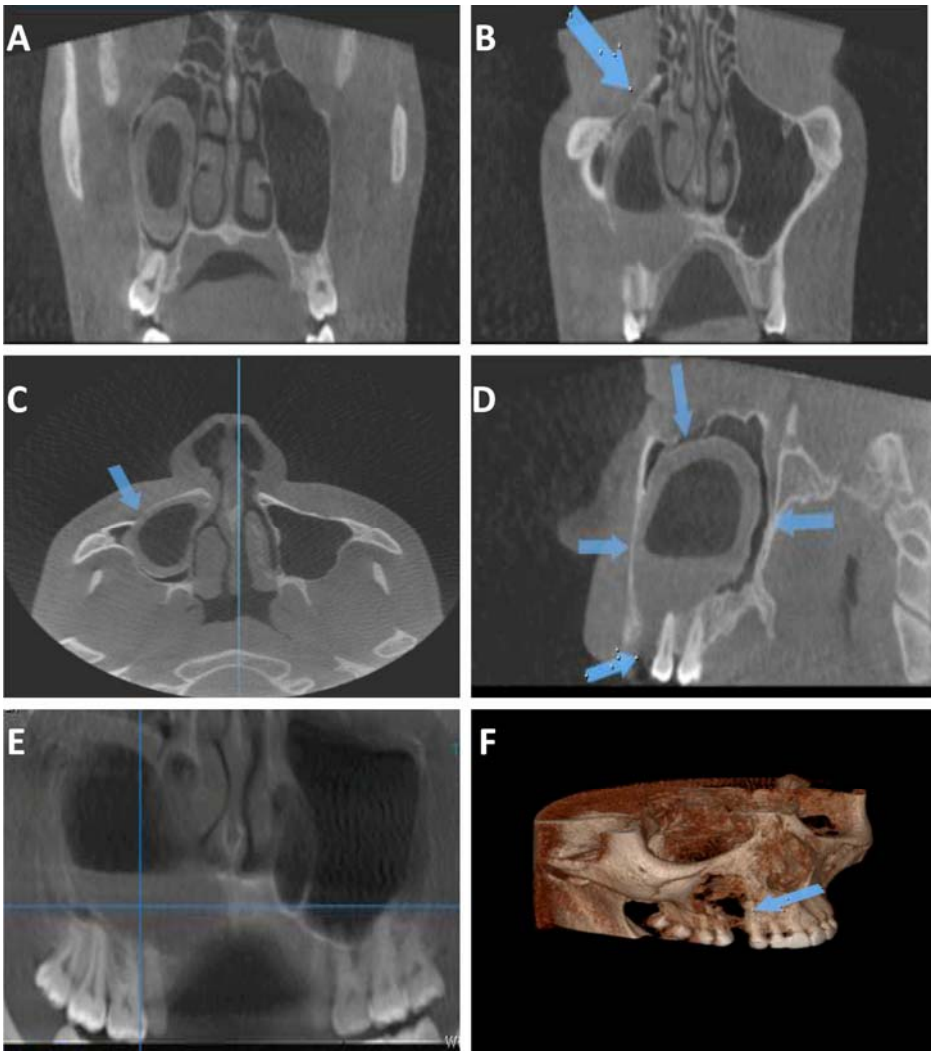

Fig. 2 – Cone-beam computed tomography (CBCT) scans 6 months following decompression. A) The coronal view clearly shows the reduced size and thickening of the cystic lesion; B) The coronal view shows decompression of the infraorbital canal and the orbit; C) The axial view shows the thickened cystic sheath and its separation from the maxillary sinus walls; D) The sagittal view demonstrates cystic reduction and canal decompression; E) Panoramic thin-slice image shows the maxillary sinus; F) The 3D image of the affected site shows the reduced bony defect.

Postoperatively, the patient was prescribed antibiotic (amoxicilline) and analgesic therapy (ibuprofen). Iodoform gauze was partially removed on the third day. Sutures and the rest of the iodoform gauze were removed on the 7th postoperative day. The wound healed uneventfully.

Discussion

Odontogenic cysts originate from the remains of the epithelium associated with odontogenesis. Radicular cysts are the most common odontogenic cysts. Enucleation is described as a basic way of treatment [2]. On the other hand, treatment of large radicular cysts still remains a challenge for clinicians. Dandotikar et al. [7] show that endodontic therapy is successful in complete resolution of large radicular cysts. Seno et al. [8] performed the endoscopic sinus surgery in the treatment of radicular cysts in the maxillary sinus. However, the same authors completely removed radicular cysts only in five out of ten cases. Kubota et al. [9] demonstrate that decompression is effective in reducing the size of cysts prior to enucleation as a definitive surgery of large cysts. Moreover, surgical decompression prior to enucleation considerably reduces intraoperative and postoperative complications [10]. However, treatment of large cysts still remains without a strict protocol.

It is unusual for radicular cysts to develop in that size. Although enucleation of odontogenic cysts is the treatment of choice, it seemed to us that insisting on enucleation of such a large cyst in the first act in the presented patient would possibly provoke several complications: first, injury to the orbital floor and the content of the infraorbital canal, with concomitant bleeding and future neural deficit, then injury to the nasal cavity and maxillary bone walls. Moreover, cystic distal outgrowth toward the maxillary tuber brings it in close proximity to the pterygopalatine fossa and maxillary artery. Injury to the artery could lead to bleeding with fatal consequences. There was also a possibility of failing to remove all parts of the cyst, causing recurrence of the lesion. For that reason we chose to perform decompression, the method suggested as first-phase therapy of large odontogenic cysts [9, 11], being described as an effective procedure in reduction of the size of radicular cysts and keratocysts [11–13]. The results of the study of Kubota et al. [9] show that speed of cystic shrinkage after decompression directly correlates to the size of radicular cysts, and that the mean decompression time is 6 months. On the other hand, Anavi et al. [12] find that the period of decompression is 9.2 months. Brøndum and Jensen [6] report the mean decompression time of 10 months. We decided to rinse cystic cavity only for 6 months, having in mind that the patient was young, with high regenerative potential. After that period, a significant reduction of the cyst was observed (Figure 2). We also noticed thickening of all cystic walls, which was important for easy surgical removal at the second stage.

The diagnosis of radicular cysts is completed by clinical examination and orthopantomogrom OPG in most cases. In case of large odontogenic cysts, additional radiographic method, such as CBCT, is needed [14]. CBCT allows precise determination of the cystic borders and its proximity to adjacent anatomical structures, as well as evidence of cortical perforation [15]. Likewise, CBCT allows the insight into the three-dimensional position of the cyst [15]. That was the reason to choose CBCT as radiographic method for our patient.

One of the disadvantages of the decompression method is a long decompression time [5]. Therefore, the patients should be disciplined and motivated for regular rinsing of the cystic cavity for a long period. The presented patient was such a person.

Surgical treatment was completed without complications. The cystic wall was thick and separated from the maxillary sinus walls, so that enucleation was easy to perform. This is in accordance with the study of Gibson et al. [16] who enucleated a large radicular cyst from the maxillary sinus after decompression, without postoperative complications. Our approach to this large radicular cyst shows that the decompression period of 6 months is quite enough for safe and easy enucleation of the cyst.

Conclusion

Having in mind that decompression with subsequent enucleation is effective treatment of large radicular cysts, it seems that decompression, as primary approach, should be considered as the treatment of choice for large odontogenic cysts in close proximity to important anatomical structures.

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REFERENCES

1. *Toller PA.* Newer concepts of odontogenic cysts. Int J Oral Surg 1972; 1(1): 3−16.
2. *Toller PA.* The osmolality of fluids from cysts of the jaws. Br Dent J 1970; 129(6): 275−8.
3. *Neaverth EJ, Burg HA.* Decompression of large periapical cystic lesions. J Endod 1982; 8(4): 175−82.
4. *Thoma KH.* Oral surgery. 3rd ed. St. Louis: Mosby; 1958.
5. *Enislidis G, Fock N, Sulzbacher I, Ewers R.* Conservative treatment of large cystic lesions of the mandible: a prospective study of the effect of decompression. Br J Oral Maxillofac Surg 2004; 42(6): 546−50.
6. *Brøndum N, Jensen VJ.* Recurrence of keratocysts and decompression treatment. A long-term follow-up of forty-four cases. Oral Surg Oral Med Oral Pathol 1991; 72(3): 265−9.
7. *Dandotikar D, Peddi R, Lakhani B, Lata K, Mathur A, Chowdary UK.* Nonsurgical management of a periapical cyst: a case report. J Int Oral Healt 2013; 5(3): 79−84.
8. *Seno S, Ogawal T, Shibayama M, Ogawa F, Fukui J, Owaki S,* et al. Endoscopic sinus surgery for the odontogenic maxillary cysts. Rhinology 2009; 47(3): 305−9.
9. *Kubota Y, Imajo I, Itonaga R, Takenoshita Y.* Effects of the patient's age and the size of the primary lesion on the speed of

shrinkage after marsupialisation of keratocystic odontogenic tumours, dentigerous cysts, and radicular cysts. Br J Oral Maxillofac Surg 2013; 51(4): 358−62.

10. *Nuñez-Urrutia S, Figueiredo R, Gay-Escoda C.* Retrospective clinicopathological study of 418 odontogenic cysts. Med Oral Patol Oral Cir Bucal 2010; 15(5): 767−73.
11. *Gaikwad R, Kumaraswamy SV, Keerthi R.* Decompression and cystectomy of the odontogenic keratocysts of the mandible: a clinical study. J Maxillofac Oral Surg 2009; 8(1): 47−51.
12. *Anavi Y, Gal G, Miron H, Calderon S, Allon DM.* Decompression of odontogenic cystic lesions: clinical long-term study of 73 cases. Oral Surg Oral Med Oral Path Oral Radiol Endod 2011; 112(2): 164−9.
13. *Pogrel AM.* Treatment of keratocysts: the case for decompression and marsupialization. J Oral Maxillofac Surg 2005; 63(11): 1667−73.
14. *Bodner L, Woldenberg Y, Bar-Ziv J.* Radiographic features of large cystic lesions of the jaws in children. Pediatr Radiol 2003; 33(1): 3−6.
15. *De Vos W, Casselman J, Swennen GR.* Cone-beam computerized tomography (CBCT) imaging of the oral and maxillofacial region: A systematic review of the literature. Int J Oral Maxillofac Surg 2009; 38(6): 609−25.
16. *Gibson GM, Pandolfi PJ, Luzader JO.* Case report: a large radicular cyst involving the entire maxillary sinus. Gen Dent 2002; 50(1): 80−1.

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