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Titanium Mesh Reconstruction for Anterior Mandible Post Odontogenic Keratocyst Excision: A Case Report

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Abstract

This article discusses the treatment of Odontogenic Keratocyst (OKC) in a 60-year-old male patient. It describes the initial symptoms, the radiographic findings, and the cytological and histopathological analysis of the cyst. The treatment modalities for OKC have varied over the years, ranging from conservative approaches such as Marsupialization to more radical techniques such as resection with continuity defect and disarticulation. In this

case, enucleation and peripheral osteotomy with a titanium mesh plate reconstruction were chosen as the treatment of choice. The article further discusses the advantages of titanium mesh plate reconstruction and the importance of excising the adjacent soft tissues. This case report highlights the successful treatment of an OKC in a 60-year-old patient, with a low recurrence rate.

Keywords: Titanium Mesh Plate, Odontogenic Keratocyst, Anterior Mandible, OKC

Introduction

The term Odontogenic keratocyst (OKC) was first used in 1956 by Phillipson to describe an odontogenic cyst lined by keratinised stratified squamous epithelium ^[1]. In 1992 the term Odontogenic keratocyst was used by World Health Organisation (WHO) synonymous with primordial cyst which was used to denote benign cyst of odontogenic origin ^[2]. Considering the high risk of recurrence, aggressive clinical course, mutations in the tumor suppresser gene (PTCH1), occurrence of satellite cysts in association with Gorlin Goltz Syndrome, WHO reclassified the cyst as a benign keratocyst odontogenic tumor (KCOT) ^[3]. As there was insufficient evidence to categorise the above-mentioned pathology, KCOT was moved back to cyst category. It's incidence peaks during second and third decades of life ^[2, 3].

Currently, there is considerable controversy among oral and maxillofacial surgeons as to what is the optimal surgical treatment for odontogenic keratocyst (OKC) and what constitutes conservative surgical therapy versus radical surgery. Gold et al have provided an excellent review of surgical terminology of lesions of the jaw bones. In the treatment of OKCs, enucleation, curettage and marsupialisation are commonly considered the conservative aspects of surgical treatment, while resection with or without continuity defect and disarticulation represent the radical spectrum of surgical treatment ^[4].

The majority of OKCs may be reached by an intraoral route, making conservative surgery an option. The preservation of the nearby bone, soft tissues, and oral structures is the clear benefit of a cautious surgical decision. A shorter hospital stays, decreased morbidity, and decreased use of medical staff and the reimbursement systems are typical outcomes of this course of therapy ^[5].

The following case describes Odontogenic keratocyst in a 60-year-old man in the anterior mandibular region that was corrected by surgical intervention.

Case report

A 60-year-old male patient reported to the dental OPD with the complaint of pain, swelling and loose anterior tooth in the lower front region of jaw from past 6 months. Patient's general condition was normal. On extra oral examination a diffuse swelling was noted in the lower jaw region extending from right to left parasymphysis region crossing the midline and from the vermilion border of the lower lip to the inferior border of the anterior mandible. (Fig 1 a and b) The overlying skin appeared normal. On Palpation the swelling was hard in consistency, non-compressible was tender with local rise in temperature. On intraoral examination, partially edentulous anterior mandible was noted. There was a diffuse swelling seen in the vestibular surface extending from distal surface of first premolar on the left side to canine on the right side with the obliteration of the vestibule. (Fig 2). Occlusal Radiograph revealed and Cone Beam Computed Tomography (CBCT) revealed well demarcated multilocular radiolucency from distal surface of premolar on the left side to canine on the right-side with thinning cortical bone along with cortical expansion in the mid symphysis region. (Fig 3 a, b, c, d)



Fig 1: a, b (left and right) Extraoral appearance of patient



Fig 2: Intraoral imaging of patient

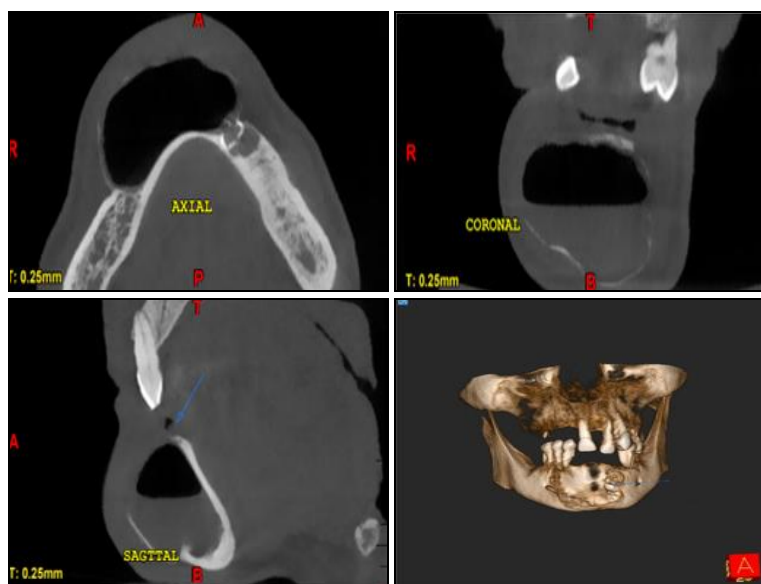


Fig: 3 CBCT imaging (left to right) a. Axial, b. Sagittal, c. coronal and d. 3 D reconstruction showing impacted canine



Fig 4: a (left) histopathology showing Epithelium lined by stratified squamous non-keratinising cells; 4 b showing FNAC

Fine needle aspiration cytology was performed using a 24-gauge needle attached to a 10 ml syringe; aspirate was clammy white with a dark streak. Smear study shown haemorrhagic material predominantly comprising of neutrophils lymphocytes and RBCs admixed with few scattered squamous cells and cellular debris. (Fig 4a) Treatment: Extra oral incision was placed in the anterior

mandibular region crossing the mid line approximating 6-8 cm in length. After Subplatysmal dissection, derroofing of the decorticated bone and cystic lining along with impacted tooth (left canine) (Fig 5c) was removed followed by curettage using Carnoy's solution was carried out (Fig 5 a and b). Irrigation with betadine and gentamycin was done.

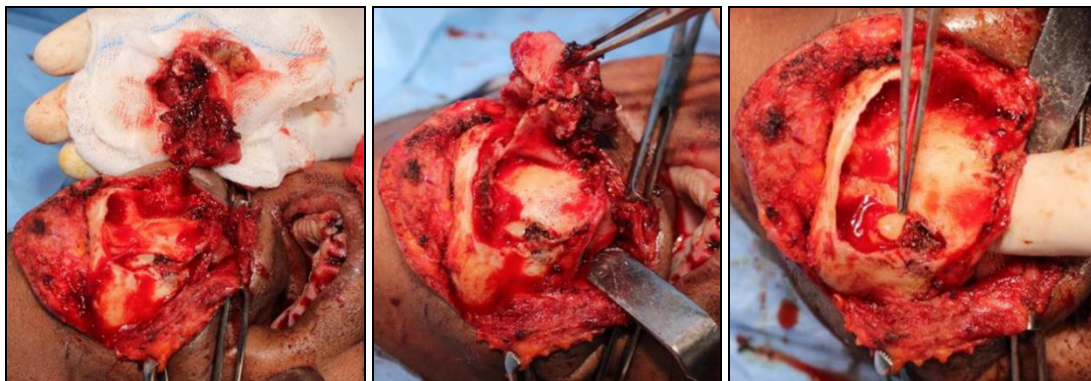


Fig 5: a (left) Cystic Lining; **Fig 5:** b (middle) Cyst Enucleation; **Fig 5:** c (right) Impacted Canine

The bony defect was filled with synthetic bone graft and PRF (plasma rich fibrin) to form a sticky bone. A prefabricated titanium mesh of dimension 1.5*6 mm was secured using 6 screws. (Fig 6) Extraoral closure was done in layers.

Peripheral osteotomy was done with using Lindemann 703 bur, and HP 8 bur (round).

The excised specimen was sent for biopsy, histopathology revealed fibro collagenous cyst wall lined focally by stratified squamous epithelium with focal areas showing mucous metaplasia and mild to moderate chronic inflammatory infiltrate comprising of lymphocytes and plasma cells, suggestive of OKC. (Fig 4 b)

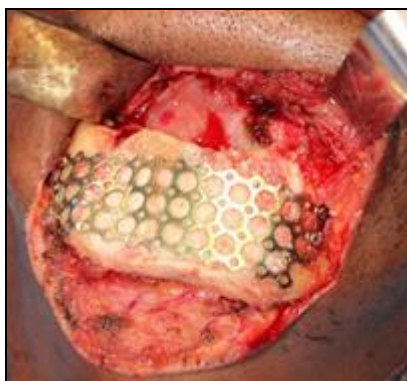


Fig 6: Orbital Titanium Mesh with Hydroxyapatite + PRF

Patient was recalled after 3 months for review and radiographs were taken. Radiographs revealed complete resolution of the lesion.

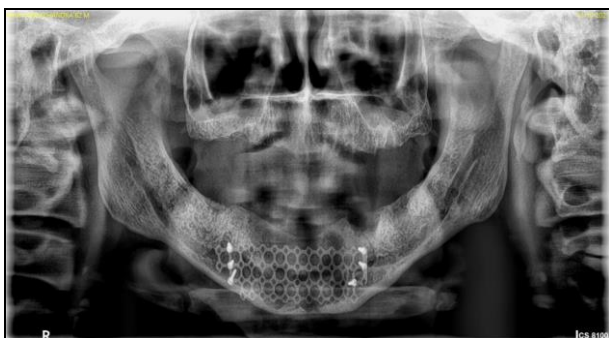


Fig 7: Post surgery, recall OPG after 3 months

Discussion

After the re-classification of OKC from benign odontogenic tumor to a developmental cyst, there has been new evidence

regarding their morphogenic and biological behaviour. The mutation of PTCH1 tumor suppressing gene is not just associated with OKC but it is also associated with follicular cyst.⁶ OKC mostly accounts for approximately 7.8 % percent of all cyst in the jaw. They have a wide age distribution (10 to 80 years) but the mean age group is in the third decade of life,^[7] but in our case, the patient was in his late 50s. 60 to 80 % of the cases occur in posterior mandible especially in the ascending ramus^[8]. OKC is known to be one of the aggressive odontogenic cysts of the oral cavity. It is also known for its rapid growth; due to higher activity of epithelial cells of the cyst lining, stimulating osteolytic activity of prostaglandin substances in the cell population of cyst lining and the higher accumulation of hyperkeratotic scales in the lumen of cyst. They tend to invade the adjacent tissues including bone and a high recurrence rate of 25 to 65%^[9].

Radiologically, OKC are characterised by well-defined unilocular or multilocular radiolucent areas with a clear periapical radio opaque rim. The borders are mostly scalloped^[10]. The presence of multiple OKCs is usually associated with nevoid basal cell carcinoma syndrome or also known as Gorlin Goltz syndrome^[11].

Bone resection offers the lowest recurrence. A recurrence rate of 0%-8.4% is noted in cases treated with segmental and marginal resection. Low recurrence rates are reported in cases treated with chemical curettage that was treated with Carnoy's Solution (60% ethanol, 30% chloroform, 10% glacial acetic acid and 1 gram of ferric chloride) this induces necrosis of the superficial tissues and eliminates tumor remnants^[12].

Recent research on immediate mandibular reconstruction has found that it is a successful therapeutic option with a consistent course of action and high success rates^[13].

Following ablative surgery, mandibular reconstruction is recommended to stabilise the remnant segment, maintain face contour, and regain masticatory function^[14]. The first two goals can be readily achieved with a simple metallic bar or plate (also referred to as a reconstruction plate), but the third and most crucial goal can only be achieved by providing bone in place of the missing mandibular segment. Over the years treatment modalities for OKC ranges from Marsupialisation^[15] (most conservative approach) to enucleation followed by open packing,^[16] Decompression following secondary enucleation,^[17] total enucleation with or without peripheral osteotomy^[18] to For bigger OKCs and recurrent lesions, radical surgery that includes excision with or without a continuity defect has been recommended^[4].

While enucleation with peripheral osteotomy is the

treatment of choice, the larger lesions as described in our case needs radical surgical methods for treatment. Whatever is the treatment of choice, it is important to note that, Branon in 1977 reported that around 16% of cases of OKC were seen adhering to the adjacent soft tissues, hence it is equally important to excise the adjacent soft tissues^[19].

In our case, the patient was treated with enucleation followed by peripheral osteotomy with a titanium mesh plate reconstruction. The titanium mesh plate is fixed with screws to the adjacent bone. The application of a titanium mesh plate offers many advantages over traditional mandibular reconstruction techniques. First, the titanium mesh plate is preformed and can be adapted to the remaining anatomy. Second, the plate can be contoured to the adjacent bone before and during the operation. Third, the plate reduces the risk of postoperative infection, and fourth, it can be used to restore masticatory function.

Conclusion

Odontogenic keratocyst is a rare but aggressive odontogenic cyst with a wide range of treatment options, including enucleation and peripheral osteotomy with titanium mesh plate reconstruction. This paper presents a successful case of a 60-year-old patient who underwent enucleation and peripheral osteotomy with titanium mesh plate reconstruction.

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