



VOLUMETRIC ANALYSIS MANIFESTING T-PRF AS A NEO OSSIFYING AGENT IN MANAGING AGGRESSIVE MANDIBULAR ODONTOGENIC KERATOCYST – A DOCUMENTATION OF RECURRENCE FREE ONE YEAR FOLLOW UP

Maxillofacial Surgery

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ABSTRACT

Introduction: An odontogenic keratocyst (OKC) is a developmental odontogenic cyst lined by squamous epithelium having intrinsic growth potential with high recurrence rate of 13 -58% .Due to its aggressive presentation it is often termed as keratocystic Odontogenic tumor. **Case Report:** A 27yearold male patient reported with swelling over the lower left side of the face associated with dull aching pain with no history of paraesthesia . Intraoral examination reveals a firm, non tender swelling over the lower labial vestibule with no evident discharge. **Diagnosis:** Following Incisional biopsy and histopathological report suggestive of Ortho keratinized odontogenic cyst was confirmed with satellite cysts appeared to be entrapped in the connective tissue wall. **Treatment:** Enucleation followed by Chemical cauterization and autologous grafting done by using T-PRF to preserve the integrity of mandible to aid in better bone regeneration. No possible recurrence with notable bone formation was reported during 6 months of follow up. **Conclusion:** The management of OKC by Chemical cauterization using Modified Carnoy's solution followed by placement of fresh autologous titanium platelet rich fibrin within the bony defect for better osseous regeneration obviating the need for surgical resection adding in future rehabilitation.

KEYWORDS

Odontogenic cyst, enucleation, modified carnoy's solution, T- PRF graft

INTRODUCTION

The odontogenic keratocyst (OKC) is a benign intraosseous cyst of the odontogenic origin with noted aggressive and invading behavior ⁽¹⁾. OKC was reclassified and termed as keratocystic odontogenic tumor (KOT) by the WHO classification of jaw tumors in 2005 . However since 2017 the keratocystic tumor have again been classified as odontogenic keratocyst due to their cordinal pathogenic cystic process ⁽²⁾ with ramus of the mandible being the most common site of occurrence ⁽³⁾. Keratocystic odontogenic tumors affect a wide age range of patients, being most prevalent in the 2nd and 3rd decades of life, with certain studies showing a slight predilection for males (1.7:1) ⁽⁴⁾. Bone resorption is one of the most severe complications of OKC and can easily give rise to large defects or even pathologic fractures when the lesions is aggressive ⁽⁵⁾

OKC can be presented with a differential diagnosis of ameloblastoma, dentigerous cyst, lateral periodontal cyst owing to its aggressive potential from other osteodestructive lesions ⁽⁶⁾

OKC is notorious for its high recurrence rate due to thin, delicate cystic lining added with the presence of small satellite cysts within the fibrous wall making it challenging to enucleate the lesion into from the surrounding bone ⁽⁷⁾

Treatment generally ranges from conservative modalities to aggressive surgical resection owing to its high recurrence potential.

Chemical cauterization using modified carnoy's solution was first described by Cutler and Zollinger, in ⁽⁸⁾1933 as a fixative solution that can penetrate cancellous spaces and thus devitalize and fix the remaining tumor cells thereby preventing recurrence ⁽⁸⁾.

Autologous T- PRF which was developed by Choukron, considered to be a viable treatment option as it increases the concentration of growth factors which facilitates more rapid healing and tissue regeneration ⁽⁹⁾

This case report of a patient who underwent complete enucleation of cystic lesion along with adjuvant measures using chemical cauterization and placement of autologous T-PRF for better regeneration outweighing the surgical site morbidity with resection.

CASE REPORT

A 27-year-old male patient reported to OPD with a chief complaint of swelling over the lower left side of the face for the past 2 months which was non-tender , associated with dull aching and no history of paraesthesia. Patient had past medical history of colitis and underwent medical management before 3 years . On examination, a diffuse swelling was evident over the left side of the face extending from left commissure of the lip till inferior border of the mandible along with the obliteration of lower labial vestibule (FIGURE 1) Fixed prosthesis was present in relation to 22 to 25 , 42 to 44 along with a retained deciduous tooth (73a) . On palpation swelling was non-tender, firm in consistency with bicortical expansion .

Orthopantomogram revealed a well defined multilocular radiolucent lesion with sclerotic margin extending from the mesial aspect of mandibular left second molar till the distal aspect of right first premolar involving the inferior border of the mandible (FIGURE 2) in addition to congenitally missing 33 along with a supernumerary tooth in relation to impacted 43.

Computed tomography revealed expansile osteolytic lesion involving the anterior mandible with breaching of buccal and lingual cortices. Differential diagnosis of OKC, ameloblastoma, and odontogenic myxoma were made.

Incisional biopsy done and histopathologically reported to be a predominantly thin stratified squamous epithelium, hyperchromatic, palisaded basal cell layer , orthokeratotic surface with small satellite cysts entrapped in the connective tissue wall suggestive of Orthokeratinised Odontogenic Cyst . Based on this features a final diagnosis of OKC in relation to 37 to 44 was made and planned for enucleation of the cystic lesion followed by chemical cauterization and autologous grafting by T- PRF grafting under general anesthesia .

Under GA , crevicular incision with bilateral relieving incision placed and full thickness mucoperiosteal flap was elevated. Extraction of 37, 36, 35,34,73,32 , 31 , 41, 42 , 44 was done along with removal of impacted teeth in relation to 43 , 33 and the supernumerary tooth. Thorough enucleation and curettage was performed and cavity inspected for remnants. Chemical cauterization was performed with

Modified Carnoy's solution followed by thorough irrigation. Autologous T-PRF membrane was prepared and placed into the cystic cavity (FIGURE 4). Postoperative antibiotic prophylaxis was given to prevent surgical site infection. Temporary prosthetic rehabilitation was fabricated to restore esthetics and functional outcomes (FIGURE 6) No recurrence has been noted clinically and radiologically upto 1 year of follow-up till date (FIGURE 7,8). Volumetric assessment of postoperative surgical site performed using CBCT data .

DISCUSSION

The term odontogenic keratocyst was originally described by Philipsen in 1956. ⁽¹⁰⁾ In 2005, WHO re-classified odontogenic keratocysts (OKC) into tumors termed as Keratocystic Odontogenic Tumor (KCOT) which was again categorized as Odontogenic Keratocyst in the year 2017 ⁽¹¹⁾. Orthokeratinized variant of OKC (OOC) was described in 1981 by Wright ⁽¹²⁾ and owing to its aggressive infiltrative behavior it is associated with a high recurrence rate ranging from 25% to 62.5% ⁽¹³⁾

OKCs may occur in two different forms, either as non-syndromic (solitary) or as syndromic variants (multiple OKCs) . Multiple incidence OKCs are typically associated with the nevoid basal cell carcinoma syndrome (NBCCS) also known as Gorlin–Goltz syndrome, an autosomal dominant multisystemic disease ⁽¹⁴⁾. Shear et al (2003) re-emphasized that OKC shows increased proliferative activity with high recurrence and it is associated with the Gorlin- Goltz syndrome/Nevoid Basal Cell Carcinoma syndrome (NBCCS)

OKC is usually asymptomatic and often discovered only during routine radiographic examination. However cystic enlargement may present with swelling, pain and purulent discharge ⁽¹⁵⁾. Expansion of cortices are often not observed in the initial stages due to its anterior-posterior enlargement .

Radiographically it appears as a radiolucent lesion with scalloped margin which is frequently associated with or without expansion and displacement of the inferior alveolar canal ⁽¹⁶⁾.

Histologically OOC it may be characterized by their 4–8 cell layered orthokeratinized squamous epithelium with substantial granulosa cell layer and low cuboidal basal cells exhibiting palisading of nuclei ⁽¹⁷⁾

Odontogenic Keratocyst mimics dentigerous cyst, ameloblastoma traumatic cyst, giant cell granuloma, and odontogenic myxoma during its normal presentation ⁽¹⁸⁾

Stoelinga's protocol involved the excision of the overlying mucosa along with the cystic lining followed by the application of Carnoy's solution followed by the use of electrocautery to remove epithelial remnants if lingual perforations are evident to prevent recurrence ⁽¹⁹⁾

Voorsmit et al (1985) proposed the application of the Modified Carnoy's solution for a duration of five minutes in the defect region resulted in necrosis of remnants with a penetration depth of 1.5mm (approximately) ⁽²⁰⁾

Tunali et al. proposed that the T-PRF protocol thereby stating that titanium tube-induced platelet activation and aggregation provides excellent biocompatibility with good osteoinductive property as it promotes tissue healing and bone ossification ⁽²¹⁾

Since surgical resection has a very minimal recurrence rate, it is seldom the first choice of treatment for a benign KCOT. Resection is typically considered when the lesion has recurred after multiple "conservative" surgeries or when the lesion has extended beyond the bone, often perforating the bony cortex and affecting surrounding soft tissues, with the potential to involve vital structures ⁽²²⁾. However, in this case there is no evidence of bony cortex perforation or involvement of vital structures conservative surgery was implemented.

Thorough enucleation followed by chemical cauterization using Modified Carnoy's solution to destroy any residual tumor cell remnants along with autologous incorporation of T- PRF within the large residual bony cavity aid in better healing and tissue regeneration negotiating the need for resection.

Volumetric assessment after 6 months demonstrated a defect volume

of 43.361cm³ with a marked reduction up to 11.537 cm³ at 12 months post operatively with concurrent radiological evidence of bone regeneration at the operated site.

CONCLUSION

Due to its aggressive behavior and increased frequency of recurrence detailed preoperative assessment of OKC is mandatory to avoid misdiagnosis. Use of adjuvant measures like chemical cauterization reduce the chances of possible recurrence, especially in cases of aggressive lesions and autologous T- PRF grafting within the residual bony defect enhances bone regeneration thereby reducing the chances of pathological fracture aiding in favourable outcome . Moreover the surgical resection and salvaging of mandible at the young adulthood can be avoided. However, long-term follow-up is recommended to rule out possible recurrence that benefits the patients quality of life.

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Declaration Of The Patient Consent:

Patients consented to clinical case report and images been discussed as part of this publication.

Conflicts Of Interests:

We declared that no known competing financial interests or personal relationships appeared to influence the work reported in this paper.



Figure 1a: Pre operative orthopantomogram

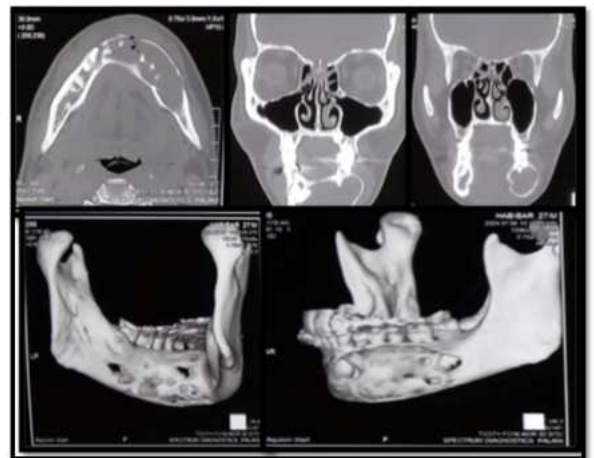


Figure 1b: Pre operative Computed Tomography revealing expansile osteolytic lesion involving the mandibular region.

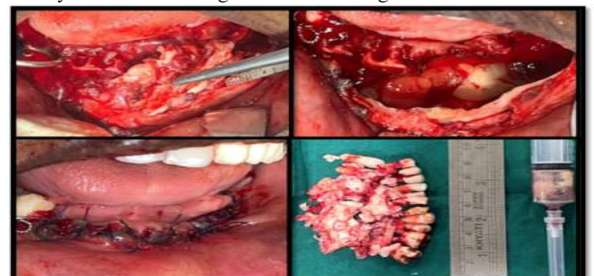


Figure 2: Surgical enucleation followed by chemical cauterization and placement of Autologous T-PRF membrane grafting .



Figure 3: Immediate post op OPG



Figure 4: Temporary prosthetic rehabilitation

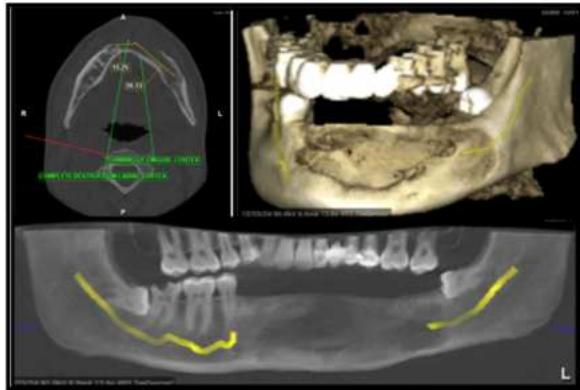


Figure 5 A: 6 Months follow up CBCT delineating successful postoperative bone regeneration



Figure 5b: 6 Months follow up orthopantomogram



Figure 6: One year follow up CBCT

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