CASE REPORT

Bilateral orthokeratinized odontogenic cyst: A rare case report and review

Rahul Devidas Pimpalkar, Suresh R Barpande, Jyoti D Bhavthankar, Mandakini S Mandale
Department of Oral Pathology and Microbiology, Government Dental College and Hospital, Aurangabad, Maharashtra, India

Address for correspondence:
Dr. Rahul Devidas Pimpalkar,
Department of Oral Pathology,
Government Dental College and Hospital,
133, Dhanwantari Nagar, Ghati Campus,
Aurangabad - 431 001, Maharashtra, India.
E-mail: rpimpalkar@gmail.com

Received: 01-03-14
Accepted: 03-07-14

ABSTRACT
Orthokeratinized odontogenic cyst (OOC) is a developmental cyst of jaw and was initially considered by the World Health Organization (1992) as the uncommon orthokeratinized variant of odontogenic keratocyst (OKC). However, studies have shown that OOC has peculiar clinicopathologic aspects when compared with other developmental odontogenic cysts, especially OKC. So orthokeratinized odontogenic cyst now stands out to be a distinct entity. Clinically, it occurs as a single cyst, shows a predilection for males and is most often found in the second to the fifth decade. Its bilateral occurrence is extremely rare. The purpose of the article is to present a rare case of bilateral OOC arising in the mandible and review the literature on bilateral occurrence of this lesion.

Key words: Bilateral, orthokeratinized odontogenic cyst, odontogenic keratocyst

INTRODUCTION

Orthokeratinized odontogenic cyst (OOC) is an uncommon developmental cyst of the jaws. The cyst was first described by Schultz in 1927, which he considered intra-osseous dermoid cyst.[1] But latter it was considered as odontogenic keratocyst (OKC). In 1981, Wright specified its clinicopathological aspects assuring that OOC is an individual entity distinct from OKC due to its limited growth potential and lower recurrence.[2] He termed it as ‘odontogenic keratocyst-orthokeratinized variant’. In 1993, Vuhahula et al. termed it as ‘jaw cyst with orthokeratinization’ and Li et al.,[3] in 1998 proposed the term ‘Orthokeratinized odontogenic cyst (OOC)’. The World Health Organization (WHO) classification for head and neck tumors (2005) has designated odontogenic keratocyst (OKC) as keratocystic odontogenic tumor (KCOT) and reclassified it as a neoplasm in view of its intrinsic growth potential and propensity to recur.[4] According to this new classification OOC is designated as a separate entity and is not to be considered a part of spectrum of KCOT. So OOC now stands out to be a distinct entity in the class of jaw cysts. It comprises 5.2% to 16.2% of cases that had been previously designated as an OKC.[1]

Bilateral/multiple occurrence of cysts is an uncommon phenomenon. Most commonly occurring bilateral cyst/lesion is OKC (if considered as cyst) and is more likely to be associated with syndrome than solitary counterpart. Bilateral occurrence of other jaw cysts is extremely rare. Here a case of OOC which occurred bilaterally in mandible is presented along with the literature review.

CASE REPORT

A 23-year-old male patient reported with a complaint of intraoral intermittent watery discharge, sour in taste from right posterior region of lower jaw since 15 days. He had a similar complaint in the left posterior region of lower jaw 3 months before, for which he visited a rural hospital. The Intra-oral periapical (IOPA) radiograph of left mandibular region [Figure 1] revealed impacted 38. Extraction of the same was advised. During extraction a cyst was noted to be associated with the tooth. It was removed along with the tooth. This was subjected to histopathological examination and diagnosis of keratocyst was made at the rural hospital.

Clinical examination revealed no abnormality extraorally. Intraorally, an unhealed area distal to 37 [Figure 2] and a deep periodontal pocket distal to 47 was noted [Figure 3]. A panoramic radiograph [Figure 4] showed a unilocular well-defined radiolucent lesion with corticated borders surrounding the impacted 48. Radiolucency was extending from distal of 47 up to half the width of ramus horizontally and from apical one-third of roots of 48 up to two-third the height of ramus vertically. On the left side of the mandible extraction socket of 38 surrounded by

Quick Response Code: 10.4103/0973-029X.140776
Website: www.jomfp.in

Access this article online
unilocular radiolucency was seen. Radiolucency was extending up to half the width of ramus horizontally and half the height of ramus vertically. Tooth displacement and root resorption was absent on both right and left quadrant. Aspiration of the lesion in the mandibular right posterior region was negative. A differential diagnosis of KCOT and dentigerous cyst (DC) was considered. An incisional biopsy of lesion in mandibular right posterior region was done. Histopathological examination [Figure 5] showed a cystic cavity lined by orthokeratinized stratified squamous epithelium, with surface showing sheaves of keratin arranged in many layers. The epithelial lining was about 4-5 cell layer thick with a distinct granular cell layer subjacent to cornified layer. The basal layer exhibited low flattened to cuboidal morphology. The epithelial-connective tissue interface was flat. The capsular tissue was made up of dense fibrous connective tissue with scanty chronic inflammatory cell infiltration. The lesion was diagnosed as OOC. Enucleation of cyst along with extraction of 48 was carried out. Microscopic findings of excisional biopsy were similar to the incisional and thus confirmed the diagnosis of OOC. Histopathological slides of the lesion on the mandibular left posterior region were reviewed which showed cystic cavity lined by stratified squamous epithelium with many layers of sheaves of orthokeratin, granular cell layer and flattened basal layer cells [Figure 6]. These histopathological features were similar to the lesion in mandibular right posterior region, diagnosed as OOC.

Considering the bilateral occurrence of the lesion, the patient was then investigated for signs of nevoid basal cell carcinoma syndrome (NBCCS) but no other abnormality was detected. Therefore, based on the clinical, radiographic and histopathological features, the final diagnosis of bilateral OOC was made.

DISCUSSION

The original paper, in which Philipsen (1956) introduced the term odontogenic keratocyst (OKC), included cases of both parakeratin and orthokeratin lined jaw cysts. Since then both parakeratinized and orthokeratinized lined jaw cysts shared a common diagnosis as OKC. But various studies carried out over the years showed these two entities to be distinct from each other. Considering the differences in behavior, recurrence rate, association with NBCCS and distinct histopathological and immunohistochemical features, parakeratinized variant of OKC is reclassified as keratocystic odontogenic.
tumor (KCOT) by WHO (2005) whereas orthokeratinized variant is now considered a distinct entity, orthokeratinized odontogenic cyst (OOC)\cite{4}.

OOC occurs predominantly in males (M: F = 2–2.5:1) with a peak incidence between 3rd–4th decade\cite{2}. Clinically, it usually presents as a slow growing, asymptomatic jaw swelling. The mandible is more often affected than the maxilla and most common location is the molar-ramus region of mandible. Radiographically, OOC appears as a well-defined unilocular radiolucency but multilocular lesions have also been reported. An association with impacted tooth is seen in 46.5-75% of cases\cite{2}.

The histogenesis of this cyst is still unclear. Zhu suggested that while the KCOT may arise from the dental lamina with the presence of the dental papilla required for its development, the OOC may arise from oral epithelium under the influence of dental papilla or only the oral epithelium.\cite{4} Vuhahala et al.\cite{1} suggested a different histogenesis for OOC associated with an impacted tooth. They stated that due to the pluripotentiality of odontogenic cyst epithelium, the reduced enamel epithelium after completing its tooth forming function has the capability to keratinize under appropriate stimuli, thus forming a true DC with orthokeratinization. They also raised the possibility that OOC could be a central epidermoid cyst. A study reported by Aragaki et al.,\cite{5} on keratin expression in KCOT and OOC, revealed a differential expression in the two. The OOC was positive for K1, K10 and Loricrin (LOR), whereas KCOT was negative for all the three, thus suggesting that keratin profile in OOC was identical to that of epidermis. On the contrary, K4, K13 and K17 expressions were strongly positive in KCOT, but negative in OOC, further reiterating that the keratin profile in KCOT was similar to dental lamina. This study did not support the origin of OOC from dental lamina, unlike KCOT. So they suggested sequestration of the stomodeal ectoderm into the developing jaw during embryogenesis as a source of origin for OOC. The results of this study also indicated that KCOT and OOC expressed unique sets of keratin subtypes, suggesting that each is a distinct entity and hence, deserve to be treated as two separate jaw cysts of odontogenic origin. Positive expression of K2 and LOR in OOC indicated that the cells were in a completely differentiated state and hence not aggressive in its behavior.

Different rare forms of OOC have been described in literature like

- Peripheral OOC
- OOC histopathologically associated with
  - Calcifying odontogenic cyst
  - Ameloblastoma
  - Heterotropic cartilage
  - Squamous cell carcinoma.
- Bilateral OOC \cite{3,6-8}

Literature review\cite{3,9-15} showed that the bilateral occurrence of jaw cysts is an uncommon phenomenon [Table 1]. Among the jaw cysts, OKC most commonly showed bilateral occurrence followed by dentigerous cyst.

Importance of this bilateral occurrence lies in the fact that it is sometimes associated with syndrome. Bilateral/multiple OKCs are known to occur in NBCCS, orofacial digital syndrome, Ehler-Danlos syndrome, Noonan syndrome and Golabi-Bahmel syndrome. Bilateral dentigerous cyst is associated with cleidocranial dysplasia and Maroteaux Lamy syndrome.\cite{11} The bilateral occurrence of the lesions is mostly synchronous, but metachronous occurrence is reported in cases of OKC.

Bilateral OOCs are rare and extensive search of literature has identified only 3 cases reflecting the true rarity of this condition [Table 2]. The cases mostly occurred in 3rd-4th decade, 2 in males and 1 in a female. Mandible was
involved in all the 3 cases; two in third molar regions and one in anterior region. Two cases were symptomatic and one was diagnosed on routine examination, which was also associated with impacted tooth. Radiographically, all presented as unilocular radiolucent lesion. Histopathologic features of all bilateral OOCs were similar to that of solitary OOC. Two of the three cases were non syndromic, data regarding syndromic association of remaining case is not available.

Immunohistochemical findings in OOC confirm their non-aggressive behavior when compared to KCOT.[7] An immunohistochemical analysis of present case was done for proliferative activity by Ki-67 [Figure 7] and anti-apoptotic activity by bcl-2 [Figure 8]. Ki 67 was positive in few cells of basal layer and bcl-2 expression was negative. These findings were similar to those observed in solitary OOC.[4]

As OOCs are less aggressive, the treatment of choice is enucleation. Two reported cases of bilateral OOC were treated by enucleation and no recurrence was noted. The present case was treated with enucleation and no recurrence is seen so far.

**CONCLUSION**

Solitary and bilateral OOC do not show differences as regard to clinical, radiographical, histopathological and immunohistochemical features. The OOCs can also present as bilateral lesions and should be included in the differential diagnosis of bilateral cystic lesions of the jaw. The present case of OOCs though bilateral was not syndromic.

**Table 1: Frequency of bilateral occurrence of different jaw cysts**

| Cyst                | Incidence (among jaw cysts) (%) | Bilateral occurrence |
|---------------------|---------------------------------|----------------------|
| Radicular cyst      | 52.2                            | Rare                 |
| Dentigerous cyst    | 17.1                            | 0.6%                 |
| KCOT                | 11.6                            | 7%                   |
| OOC                 | 10 of OKC                       | Rare                 |
| Nasopalatine duct cyst | 11.2                      | Rare                 |
| Paradental cyst     | 2.7                             | 4%                   |
| Solitary bone cyst  | 1                               | 1/5<sup>b</sup>      |
| COC/CCOT            | 0.8                             | Rare (2 cases reported) |
| Nasolabial          | 0.6                             | 10%                  |
| GOC                 | 0.012-1.3                       | Rare (1 case reported) |

*Excluding radicular cyst of maxillary left and right central incisor post trauma. KCOT: Keratocystic odontogenic tumor, OOC: Orthokeratinized odontogenic cyst, COC: Calcifying odontogenic cysts, CCOT: Calcifying cystic odontogenic tumor

**Table 2: Review of literature of bilateral orthokeratinized odontogenic cysts**

| Author/year         | Age/sex | Location               | Treatment                        | Recurrence                  | Association with syndrome |
|---------------------|---------|------------------------|----------------------------------|-----------------------------|--------------------------|
| Borello 1976        | */M     | Anterior mandible      | *                                | No                          | *                        |
| Fransisco et al. 2012 | 23/F   | Mandibular third molar region | Enucleation                      | No (follow-up of 27 months) | No                        |
| Premalatha et al. 2012 | 35/M   | Mandibular third molar region | Right-enucleation | * | No                        |

*Data not available, M: Male, F: Female

**Figure 7:** Few basal cell nuclei of lining epithelium of OOC positive for ki-67 (Right side), (IHC stain, x400)

**Figure 8:** Lining epithelium of OOC negative for bcl-2 (Right side) (IHC stain, x400)
REFERENCES

1. Vuhahula E, Nikai H, Ijjuin N, Ogawa I, Takata T, Koseki T, et al. Jaw cysts with orthokeratinization: Analysis of 12 cases. J Oral Pathol Med 1993;22:35-40.
2. Wright JM. The odontogenic keratocyst: Orthokeratinised variant. Oral Surg Oral Med Oral Pathol 1981;51:609-18.
3. Kasat VO, Saluja H, Kalburge JV, Kini Y, Nikam A, Laddha R. Multiple bilateral supernumerary mandibular premolars in a non syndromic patient with associated orthokeratinised odontogenic cyst- A case report and review of literature. Contemp Clin Dent 2012;3:S248-52.
4. Yanduri S, Veerendra Kumar B, Shyamala K, Girish Rao S. Orthokeratinised odontogenic cyst. Indian J Dent Adv 2010;2:149-52.
5. Agaraki T, Michi Y, Katsube K, Uzawa N, Okada N, Akashi T, et al. Comprehensive keratin profiling reveals different histopathogenesis of keratocystic odontogenic tumour and orthokeratinised odontogenic cyst. Hum Pathol 2010;41:1718-25.
6. MacDonald-Jankowski DS. Orthokeratinised odontogenic cyst: A systematic review. Dentomaxillofacial Radiol 2010;39:455-67.
7. Pereira FD, Vidal MT, Campo PS, Neto AA, Fernandes LC, dos Santos JN. Orthokeratinised odontogenic cyst: A report of two cases in the mandible. Rev Odonto Cienc 2012;27:174-8.
8. Premalatha BR, Roopa SR, Jude J, Kavitha P. Bilateral orthokeratinised odontogenic cyst: An unusual presentation and review. Int J Contemp Dent 2012;23:73-6.
9. Shear M, Speight PM. Cysts of the oral and maxillofacial regions. 4th ed, Blackwell Munksgaard: Denmark; 2007. p. 2.
10. Gaynor WN. Bilateral radicular cysts of mandibular deciduous teeth: A case report. N Z Dent J 2012;108:106-9.
11. Tamgadge A, Tamgadge S, Bhatt D, Bhalerao S, Perciera T, Padhye M. Bilateral dentigerous cyst in non-syndromic patient: Report of an unusual case with review of literature. J Oral Maxillofac Pathol 2011;15:91-5.
12. Ciciani M, Grossi GB, Borgonovo A, Santoro G, Pallotti F, Maiorana C. Rare bilateral nasopalatine duct cysts: A case report. Open Dent J 2010;4:8-12.
13. Borgonovo AE, Reo P, Grossi GB, Maiorana C. Paradental cyst of the first molar: Report of a rare case with bilateral presentation and review of the literature. J Indian Soc Pedod Prev Dent 2012;30:343-8.
14. Hiroyuki TA. Case of bilateral calcifying odontogenic cyst. Shika Hoshasen 1995;35:167-71.
15. Amberkar VS, Jahagirdar A, Ahmed Mujib BR. Glandular odontogenic cyst: Report of an unusual bilateral occurrence. Indian J Dent Res 2011;22:364.

How to cite this article: Pimpalkar RD, Barpande SR, Bhavthankar JD, Mandale MS. Bilateral orthokeratinized odontogenic cyst: A rare case report and review. J Oral Maxillofac Pathol 2014;18:262-6.

Source of Support: Nil.
Conflict of Interest: None declared.