Case report

A CASE OF AMELOBLASTOMA ASSOCIATED WITH ODONTOGENIC KERATOCYST AND REVIEW OF LITERATURE

Edetanlen BE,[1] Osayande O,[2] Ehizonaga JI [2]

[1]Department of Oral and Maxillofacial surgery, University of Benin Teaching Hospital, Benin-city, Edo state, Nigeria. [2] Department of Oral and Maxillofacial Pathology and Medicine, University of Benin, Benin-city, Edo state, Nigeria.

ABSTRACT

BACKGROUND: A rare combination of odontogenic lesions comprising of ameloblastoma and odontogenic keratocyst (OKC) has been reported among Asians and Caucasians. However, there is no report of similar association of both lesions among Africans in the English literature.

OBJECTIVE: This study reports a rare case of ameloblastoma associated with odontogenic keratocyst in a Nigerian female and highlights the related diagnostic challenges and treatment considerations.

CASE REPORT: A 26-years-old Nigerian female presented with a complaint of recurrent pain and blood-stained pus-like discharge from the left lower jaw of the patient which coincided with post-extraction site of a third molar tooth. A clinical diagnosis of chronic osteomyelitis was made. Antibiotics and analgesic were administered. Orthopantomogram of the mandible showed a left multilocular radiolucency with well-defined cortical border. Computed tomography (CT) scan showed anterio-posterior mandibular hypodense lesion extending from distal root of tooth number 37 (FDI numbering system) up to the level of zygmoid notch. An incisional biopsy was done and histological examination of the specimen revealed the presence of odontogenic keratocyst. A mandibular resection with disarticulation and immediate reconstruction under general anaesthesia was subsequently done for the patient. Post-surgical histological examination of serial sections of the lesion revealed a multicystic ameloblastoma. There was no recurrence after a follow-up period of 2 years.

CONCLUSION: This report suggests a possible neoplastic transformation of OKC to ameloblastoma or a hybrid tumour consisting of ameloblastoma and OKC as both lesions are putatively from the remnant of dental lamina.

Keywords: Ameloblastoma, odontogenic keratocyst, hybrid odontogenic tumours

Correspondence address:

Dr Edetanlen E.B.

Department of Oral and Maxillofacial surgery, University of Benin of Benin Teaching Hospital, Benin-city, Edo state, Nigeria
+2348024223651.
ehiben2002@yahoo.com

INTRODUCTION

The process of odontogenesis is prolonged and complex. The tumours derived from epithelial, ectomesenchymal and/or mesenchymal elements that are, or have been, part of the odontogenic apparatus are called odontogenic tumours.[1,2] Despite the World Health Organization (WHO) classification of odontogenic tumours, unique odontogenic lesions with combined histologic features have been encountered occasionally.[3-11] Hybrid tumours are very rare tumour entities, which are composed of two different tumour entities, each of which conforms with a well-defined tumour category. Whereas, a hybrid odontogenic tumour is defined as follows: "A lesion showing the combined histopathological characteristics of two or more previously recognized tumours and/or cysts of different categories.[3]

Ameloblastoma is a benign odontogenic tumour arising from the odontogenic apparatus and shows odontogenic epithelium with mature fibrous stroma, without ectomesenchyme. It is the best known and the most frequently seen odontogenic tumour.[12-14] It accounts for approximately 1% of all jaw cyst and tumours.[12] Clinically, it behaves as a benign, locally invasive tumour with tendency to recur after treatment. Histologically, it exhibits a wide spectrum of variation, namely acanthomatous, basal cell, granular cell, unicystic, desmoplastic and clear cell differentiation.[13]

Odontogenic keratocyst (OKC) is a developmental odontogenic cyst reported to be the third most common odontogenic cyst. OKC accounts for approximately 3-11% of all odontogenic cysts. Clinically, it is characterised by a tumour-like potentially aggressive behaviour. It is found in wide age range with peak age incidence between second and third decades of life and often seen (60% to 80%) in the posterior mandible[4]. OKC can present either as a unilocular (smaller cyst) or multilocular (larger cyst) radiolucent lesion with sclerotic border radiographically.[15-17] Histologically, two distinct variants are recognised: parakerantinised and orthokeratinised OKC.[15]

The histogenesis and clinicoradiologic behaviour of OKC and ameloblastoma are somewhat similar. Both lesions are derived from remnants of dental lamina, although other histogenetic theories have been postulated.[18] The posterior mandibular segment is the most commonly involved site for both lesions and both usually present radiologically as multilocular radioluscent lesion.[2,19] Their high rate of recurrence has also been well documented.[18] While both lesions present histopathologically with a distinct basal layer of palisaded columnar or cuboidal cells with reversal of nuclear polarity, OKC is constituted by a cystic space containing desquamated keratin, lined with a uniform parakeratinized squamous epithelium of 5 to 10 cell layers, with a flat interface with the adjacent connective tissue.[20]

A hybrid odontogenic tumour comprising two distinct lesions is extremely rare. Owing to the rarity of the lesion, there is poor characterisation of these lesions. Hybrid odontogenic lesion was defined as a lesion showing the combined histopathological characteristics of two or more previously recognised odontogenic tumours and /or cysts of different categories[21] Combined odontogenic neoplasms have rarely been documented. Such tumours have also been described by other researchers[3,9,10] as “hybrid lesions”. The histologic features are often identical to other individually well-established odontogenic neoplasm such as ameloblastoma, [2] adenomatoid odontogenic tumour, [3-5] ameloblastic fibroma, and ameloblastic fibro-odontoma[7] ,[11]. Their clinical presentation is variable, ranging from cysts to neoplasms showing varying degrees of aggressive behaviour.

Most combined tumours contain features of one of the odontogenic tumours in combination with either a calcifying epithelial odontogenic cyst or calcifying epithelial odontogenic tumours[7,11]. Predicting clinical outcome is challenging when a combination tumour is encountered due to the paucity of such lesions. An understanding of salient features of these entities is required to differentiate them from the more common

conventional neoplasms to expand classification and provide prognostic criteria.

It has been demonstrated that ameloblastoma and odontogenic keratocyst (OKC) show similar clinical characteristics[2]. The simultaneous occurrence of ameloblastoma and OKC was first described by Siar and Ng[22] under the name keratinizing ameloblastoma (KA). It consisted of an admixture of solid and cystic components. The solid nests resembled follicular ameloblastoma with pronounced keratinization, while the cystic areas bore features of OKC. The solid tumours were in direct continuity with cysts.[22,23]

A thorough search of the literature revealed eight previously reported cases of OKC combined with ameloblastoma.[22-25] No combined odontogenic lesion with distinct features of both ameloblastoma and odontogenic keratocyst have been reported among Africans. This study reports a rare case of ameloblastoma associated with odontogenic keratocyst in a Nigerian female and highlights the related diagnostic challenges and treatment considerations.

CASE REPORT

A 26 years old Nigerian female who presented at the Oral and Maxillofacial Surgery Clinic, University of Teaching Hospital, Benin City, Nigeria, with a complaint of recurrent pain and blood-stained pus-like discharge. The patient claimed that this complaint started 7 years ago after the removal of a symptomatic left lower jaw molar tooth. The medical history was insignificant.

On examination, no significant facial swelling was observed extraorally. However, intraorally, creamy purulent-like discharge was observed in the site of non-healing alveolar socket of extracted left mandibular third molar tooth (38) and there was slight swelling of the surrounding gingiva. There were no associated mobile teeth. A clinical diagnosis of chronic osteomyelitis was made and the patient was placed on clindamycin for three weeks but the discharge continued although pain subsided. Orthopantomogram of the mandible revealed a left multilocular radiolucent lesion with well-defined cortical border extending from the posterior aspect of the second molar tooth (37) up to neck of the condyle [Figure 1]. Computed tomography (CT) scan showed left anterioposterior mandibular hypodense lesion extending from distal root of tooth 37 up to the level of zygmoid notch (Figure 2).

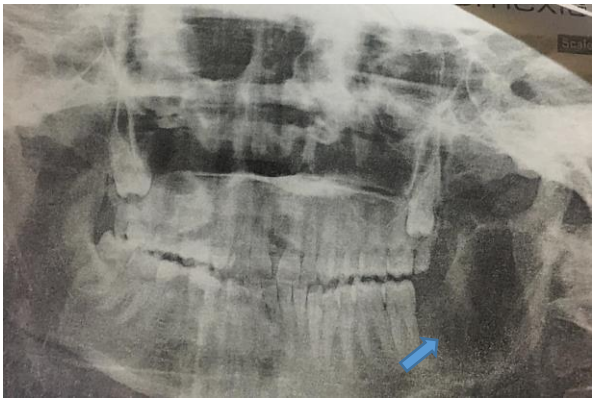

Figure 1: A panoramic radiograph showing multilocular radiolucency in the left molar-ramus region (blue arrow).

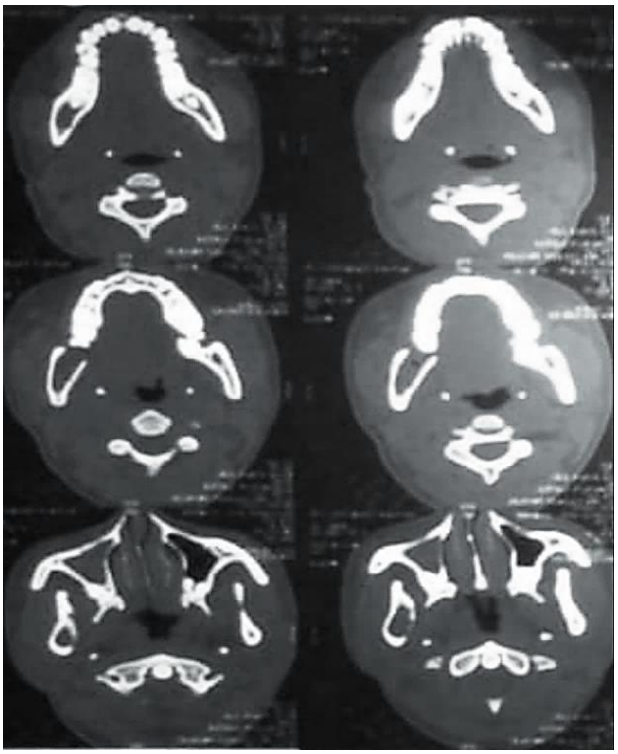

Figure 2. Axial CT showing left posterior mandibular ramus hypodensity.

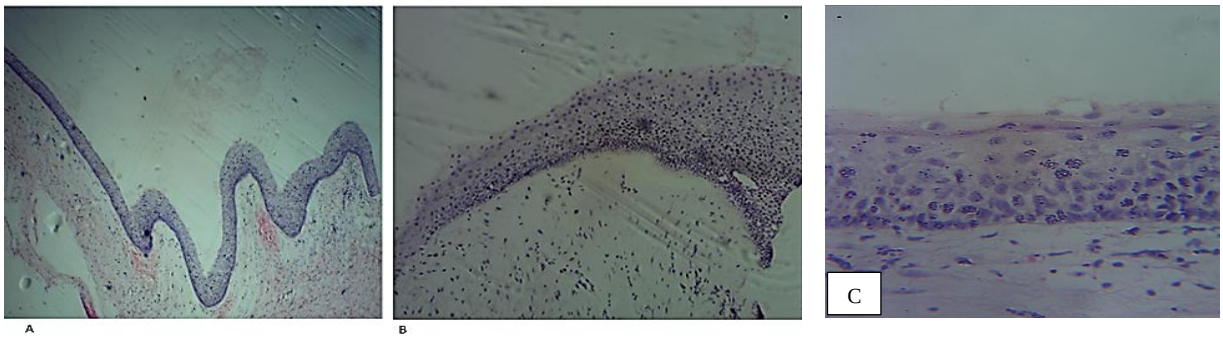

Fig 3. Pre-surgical photomicrograph showing odontogenic keratocyst with surface corrugated parakerantinized stratified epithelium, palisaded hyperchromatic basal cells (A) and a focus of epithelial thickening (B)[H&E, ×40]. Fig 3C. Pre-surgical photomicrograph showing palisaded hyperchromatic basal cells, flat epithelia- connective tissue junction and parakeratinization of the surface epithelium. (H&E, ×400).

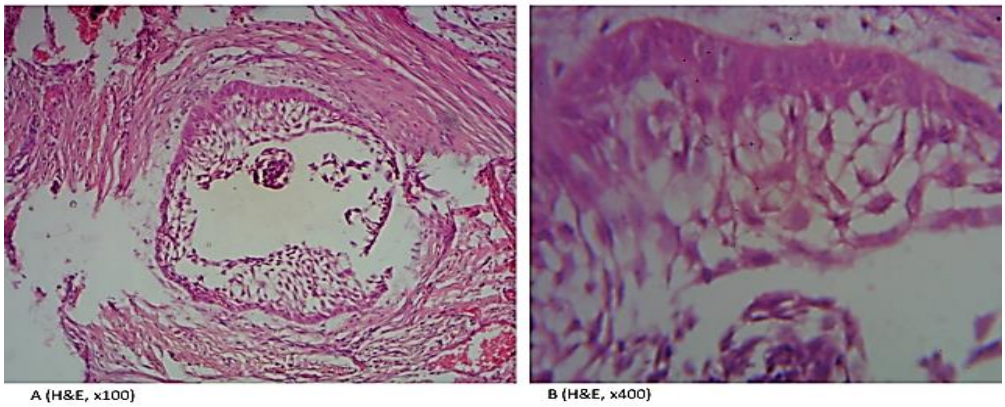

Fig 4. Post- operative photomicrograph displaying features consistent with ameloblastoma with follicular island of odontogenic epithelium (A), peripheral palisaded ameloblast- like cells and central loose stellate cells (B) [H&E, ×100]

Incisional biopsy revealed cystic lesion composed of a cystic cavity lined by a corrugated parakeratinized stratified epithelium with palisaded hyperchromatic basal cells, flat epithelial-connective tissue junction. There was a focal thickening and proliferation of the epithelial lining into the surrounding fibrous capsule with infiltrates of inflammatory cell within the capsule (Figures 3A, 3B and 3C). A pre-operative diagnosis of odontogenic keratocyst was made.

Mandibular resection with disarticulation and immediate reconstruction under general anaesthesia was performed. Post-surgical histological examination of serial sections of the specimen revealed a benign lesion composed of islands of proliferation of odontogenic epithelium within a fibrous connective tissue stroma. The epithelium consists of outer ameloblast-like cells and inner stellate cells containing variable cystic spaces and foci of chronic inflammatory cell infiltrations [Figure 4A and 4B]. From histologic findings obtained from pre-surgical and post-surgical biopsy specimens, a diagnosis of multicystic ameloblastoma associated with OKC was made. There was no recurrence after a follow-up period of 2 years (Figure 5).

DISCUSSION

Ameloblastoma and odontogenic keratocyst are lesions of odontogenic origin with common clinicoradiologic features but histopathologically and prognostically distinct, although they may also share some common histopathologic

features. Both lesions are derived from remnants of the dental lamina but ameloblastoma could also arise from the lining of a pre-existing odontogenic cyst.[18,19]

This case report of a young Nigerian female also presented within the age, gender and clinical site that is consistent with the features previously reported in ameloblastoma and OKC. The association between these odontogenic lesions could be: hybrid or combined lesions; ameloblastomatous change in the lining of a pre-existing OKC; a collision lesions or a synchronous occurrence of the two lesions at different sites in the same jaw bone.[15,18,21-25]

The present case report may be a rare hybrid neoplasm because combined histological diagnoses of OKC and multicystic ameloblastoma were found from pre and post-surgical biopsies. The clinic-radiological features and treatment of this present case have been compared with those of some previously reported cases in [Table 1].[22-25] Clinically and radiologically, OKC and ameloblastoma are indistinguishable due to similar location of occurrence and age of patient[2]. In both OKCs and ameloblastomas, the mandible is affected twice as often as the maxilla and there is a predilection for the molar-ramus region as seen in the present case that occurred in the posterior mandible[13,14].

Table 1: Summary of all hybrid odontogenic tumours (OKC + ameloblastoma) reported globally

Author	Country	Year	Gender	Age	Clinical feature	Radiological features	Treatment
Siar & Ng[22]	Malaysia	1993	M	30	Painless expansile swelling of 5years involving the anterior mandible	Multilocular radiolucency	Resection
Siar & Ng[22]	Malaysia	1993	M	35	Swelling of 6 months duration in left posterior mandible	No information	Resection
Siar & Ng[22]	Malaysia	1993	F	35	Right maxillary of 9 months duration with bucco-palatal expansion	Ground glass appearance with indistinct borders	Unknown
Siar & Ng[22]	Malaysia	1993	F	39	Incidental findings in the radiograph. No swelling.	Cystic radiolucency	Enucleation
Neuman et al.[25]	US	2015	F	17	Posterior mandibles	Large multilocular radiolucency	Enucleation
Gamoh et al.[24]	Japan	2015	M	45	Nil presentation of facial swelling which was detected as incidental findings in patient with crown dislocation of a tooth in the right posterior mandible Hard swelling in the left posterior mandible of 4 months duration.	Multilocular radiolucency	Enucleation and curettage without recurrence at 6 months follow-up
Gupta et al[23]	India	2016	M	22	Aspiration of straw-coloured creamy fluid	Multilocular radiolucency with resorption of related teeth	Enucleation and no recurrence reported
Present case	Nigeria	2020	F	26	Discharge of non-purulent creamy fluid seen as incidental findings after tooth extraction. No facial swelling was observed	Multilocular radiolucency	Resection and no recurrence after 2 years

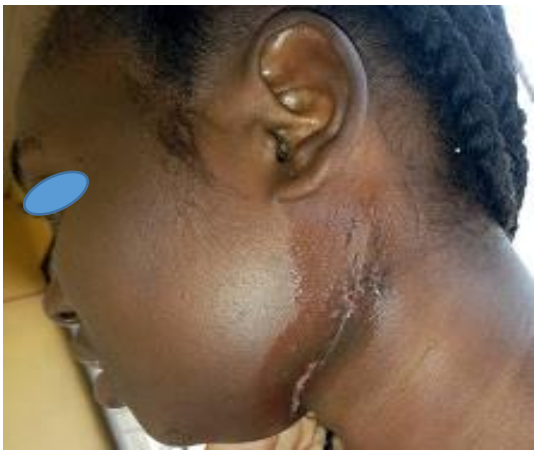

Fig. 5: Post-surgical photograph showing healed operation site with submandibular incision scar.

The age of 26 years of the present case was within the age range of 17-54 years reported from previous cases of hybrid lesion of ameloblastoma and OKC (Table 1).[22-25] From reported cases of hybrid OKC and ameloblastoma, there seems to be no gender predilection and this could relate to the absence of gender differences between ameloblastoma and OKC. The hybrid OKC and ameloblastoma can be present without any facial swelling and hence several previous cases were accidental findings (Table 1),[22-25] similarly in the present case the patient had non-purulent discharge in post extraction socket with slight gingival swelling.

Radiologically, the present case and most cases of hybrid OKC and ameloblastoma were multilocular radiolucent lesions. However, ground glass appearance was reported in a 35-year female Malaysian.[22] Bucco-lingual expansion was less commonly reported in previous cases (Table 1),[22-25] similarly the present case, no bucco-lingual expansion was seen clinically despite the extensive antero-posterior lesional radiological spread. This is an indication to raise awareness of high index of suspicion by taking routine radiograph for all patient indicated for removal of teeth. The diagnosis of the lesion as a hybrid odontogenic tumour due to the observation of the features of both OKC and ameloblastoma is however challenging, since the histopathological diagnoses were made from pre and post-surgical specimens respectively.

In general, the biologic behaviour of hybrid odontogenic tumours does not differ from that of other solid ameloblastoma. Since the long-term behaviour of hybrid odontogenic lesion remains unknown, the most appropriate approach is yet to be determined. Treatment of hybrid odontogenic lesion of OKC and ameloblastoma varies from enucleation to resection with a favourable outcome (Table 1).[22-25] The present case was treated with mandibular resection with condylar disarticulation without recurrence after 2 years of follow-up, suggesting the possibility of hybrid histological presentation of ameloblastoma and OKC in a jaw. This knowledge indicates a valuable warning as both lesions have high recurrence rate and require long term patient follow-up. As most recurrence occurred in the first five years, yearly follow-up is advisable during this period.

Although, there is reason to suggest that the present case is a hybrid lesion, it may be difficult to differentiate a hybrid lesion with combined OKC and ameloblastoma from a pre-existing odontogenic keratocyst with ameloblastomatous change. A case of a hybrid or combined lesion reported by Gupta et al.,[23] revealed radiological evaluation of a posterior mandibular radiolucent lesion which was separated in two parts by an intact bone and the third molar tooth, while the histopathology of the same lesion revealed both lesions as distinct. Though the type of association in this present case may not be very clear, there are some clinical and histopathological evidences to suggest a possible neoplastic (ameloblastomatous) transformation. In this case, there was a single radiological lesion without any form of bony demarcation of the lesion. Furthermore, there was a focus of possible neoplastic proliferation of the epithelial lining of the OKC diagnosed preoperatively.

In conclusion, this report suggests a possible neoplastic transformation of OKC to ameloblastoma or a hybrid tumour consisting of ameloblastoma and odontogenic keratocyst because both lesions are putatively from the remnant of dental lamina. Further studies using immunohistochemistry with monoclonal

antibody may be of benefit in assessing the true nature of the epithelial lining in this lesion.

Conflict of Interest: None declared

REFERENCES

1. Oginni FO, Stoelinga PJ, Ajike SA et al. A prospective epidemiological study on odontogenic tumours in a black African population, with emphasis on the relative frequency of ameloblastoma. Int J Oral Maxillofac Surg 2015; 44: 1099–1105.
2. Kitisubkanchana J, Reduwan NH, Poomsawat, S. et al. Odontogenic keratocyst and ameloblastoma: radiographic evaluation. Oral Radiol 2020. https://doi.org/10.1007/s11282-020-00425-2
3. Damm DD, White DK, Drummond JF, Poindexter JB, Henry BB. Combined epithelial odontogenic tumor: adenomatoid odontogenic tumor and calcifying epithelial odontogenic tumor. Oral Surg Oral Med Oral Pathol 1983; 55:487-496.
4. Bingham RA, Adrian JC. Combined epithelial odontogenic tumor-adenomatoid odontogenic tumor and calcifying epithelial odontogenic tumor: report of a case. J Oral Maxillofac Surg 1986; 44:574-577.
5. Takeda Y, Kudo K. Adenomatoid odontogenic tumor associated with calcifying epithelial odontogenic tumor. Int J Oral Maxillofac Surg 1986;15: 469-473.
6. Etit D, Uyaroglu MA, Erdogan N. Mixed odontogenic tumor: ameloblastoma and calcifying epithelial odontogenic tumor. Indian J Pathol Microbiol 2010;53: 122-124.
7. Seim P, Regezi JA, O'Ryan F. Hybrid ameloblastoma and calcifying epithelial odontogenic tumor: case report. J Oral Maxillofac Surg 2005;63: 852-855.
8. Hisatomi M, Asaumi J, Konouchi H, Yanagi Y, Kishi K. A case of glandular odontogenic cyst associated with ameloblastoma: correlation of diagnostic imaging with histopathological features. Dentomaxillofac Radiol 2000;29: 249-253.
9. Badger KV, Gardner DG. The relationship of adamantinomatous craniopharyngioma to ghost cell ameloblastoma of the jaws: a histopathologic and immunohistochemical study. J Oral Pathol Med 1997;26: 349-355.
10. Chen SH, Katayanagi T, Osada K, Hamano H, Inoue T, Shimono M, et al. Ameloblastoma and its relationship to ameloblastic fibroma: their histogenesis based on an unusual case and review of the literature. Bull Tokyo Dent Coll 1991; 32:51-56.
11. Wadhwan V, Sharma P, Bansal V. A rare case of hybrid odontogenic tumor: Calcifying epithelial odontogenic tumor combined with ameloblastoma. J Oral Maxillofac Pathol 2015; 19:268
12. Omoregie F O, Okoh D S, and Ojo M A. Odontogenic tumors in Benin City, Nigeria: Analysis of 220 Cases and Review of Literature. African Journal of Oral Maxillofacial Pathology and Medicine, 2015; 1(1): 17 – 26.
13. Ledesma-Montes C, Mosqueda-Taylor A, Carlos-Bregni R, Romerode León E, Palma-Guzmán JM, Paez-Valencia C, Meneses-Garcia A. Ameloblastomas: a regional Latin-American multicentric study. Oral Diseases 2007; 13:303-307.
14. Brown NA, Betz BL (2015). Ameloblastoma: a review of recent molecular pathogenetic discoveries. Biomark Cancer 2015; 7: 19–24.
15. Tariq S, Chalkoo A F. Combined odontogenic tumor-odontogenic Keratocyst and Ameloblastic Fibroma: A case report. P Int J Maxillofac Imaging 2020; 6:24-628
16. Motwani M B, Mishra S S, Anand R M, Degwekar S S, Bhowate R R. Keratocystic odontogenic tumor: Case report and review of the literature. J Indian Acad Oral Med Radiol 2011; 23:150-4
17. Rajkumar G C, Hemalatha M, Shashikala R, Sonal P. Massive keratocystic odontogenic tumor of mandible. A Report of a case and review of the literature. Indian J Dent Res 2011; 22:181
18. Ahmadian M, Freedman P, Reich R. Ameloblastoma arising in odontogenic keratocyst: report of four rare cases, immunohistochemical analysis and review of literature. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2019;128(1): e86-7.
19. Firth N, Alsarraf A, Vujcich N, Kujan O. Synchronous occurrence of odontogenic keratocyst and ameloblastoma: A case report and review of the literature. Clinics and practice. 2020;10(2): 42-46
20. El-Naggar AK, Chan JK, Grandis JR, Takata T, Slootweg PJ, editors. WHO classification of head and neck tumours. International Agency for Research on Cancer: Lyon 2017, p.205-260.

21. Ide F, Horie N, Shimoyama T, Sakashita H, Kusama K. So-called hybrid odontogenic tumors: do they really exist? Oral Med Pathol 2001; 6:13-21
22. Siar C H, Ng KH. 'Combined Ameloblastoma and Odontogenic Keratocyst' or 'Keratinizing Ameloblastoma'. Br J Oral and Maxillofac Surg 1993; 31: 183-186.
23. Gupta R K, Dugal AG, Pawar SR, Khandelwal SG, Iyengar A. A rare simultaneous occurrence of odontogenic keratocyst and unicystic ameloblastoma in mandible: A case report. J Clin Diagn Res. 2016; 10:1-4.
24. Gamoh S, Akiyama H, Tominaga K, Nakajima M, Kakudo K, Tanaka A, et al. Simultaneous occurrence of keratocystic odontogenic tumor and ameloblastoma in the mandible: A case report. Oncology Letters. 2015;10: 785-789.
25. Ashley Nicole Neuman, Lindsay Montague, Donald Cohen, Nadim Islam, and Indraneel Bhattacharyya. Report of Two Cases of Combined Odontogenic Tumors: Ameloblastoma with Odontogenic Keratocyst and Ameloblastic Fibroma with Calcifying Odontogenic Cyst. Head Neck Pathol. 2015; 9(3): 417–420.