

CASE REPORT

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Calcifying odontogenic cyst in a 91-year-old man

Paolo Boffano^{1,2*}, Muhammad Ruslin² and Andrea Melle¹

Abstract

Background Calcifying odontogenic cyst (COC) is a developmental odontogenic cystic lesion that is lined by ameloblastoma-like epithelium, that includes focal ghost cells. COC is rare, representing less than 1% of odontogenic lesions. COCs are diagnosed at all ages and they have a mean age of about 30 years with a similar male and female genders distribution. The purpose of the present article is to present and discuss the diagnosis and management of a 91-year-old man affected by COCs.

Case presentation A 91-year-old male subject was referred for a swelling in the left body of the mandible. Intraoral examination revealed a hard blueish swelling in correspondence of the lingual side of the left mandibular body, extended to the oral floor. It was decided to perform a CT scan, that revealed a well-defined, unilocular, radiolucent lesion extending from the lingual corticle of the left mandibular body to the oral floor. Under local anesthesia, the cyst underwent en bloc enucleation and curettage and was sent for pathological examination, that confirmed the diagnosis of calcifying odontogenic cyst.

Conclusions Enucleation with curettage still represents the treatment of choice for COCs. Resection may be considered in selected cases when an aggressive clinical behavior is observed or a high recurrence rate is suspected. A strict follow-up is advised to monitor eventual recurrences. In large lesions, or when the patient is affected by severe comorbidities, conservative treatments such as decompression and marsupialization may still be proposed.

Keywords Calcifying odontogenic cyst, Odontogenic cyst, Surgery, Diagnosis, Management

Introduction

Calcifying odontogenic cyst (COC) is a developmental odontogenic cystic lesion that is lined by ameloblastoma-like epithelium, that includes focal ghost cells. COC is rare, representing less than 1% of odontogenic lesions. COCs are diagnosed at all ages and they have a mean age of about 30 years with a similar male and female genders distribution [1–14].

It is still unclear if COCs are neoplasms rather than developmental cysts, due to their unpredictable clinical

behavior, although the hypothesis of the developmental cyst arising from dental lamina is currently favoured because of the behaviour and clinico-pathological features. COC may be observed in both maxilla and mandible, with a preference to the anterior regions. In the literature, rare cases of extraosseous COCs in the anterior regions of the jaws have been reported.

The diagnosis of this cyst may be incidental following the execution of routine periapical or panoramic radiographs [1–4, 15–28].

COC may be intraosseous or extraosseous. The intraosseous form is more frequently encountered with or without swelling, while the extraosseous variant commonly presents as a clinical swelling [2–4].

The purpose of the present article is to present and discuss the diagnosis and management of a 91-year-old man affected by COCs.

*Correspondence:

Paolo Boffano
paolo.boffano@gmail.com

¹ University of Eastern Piedmont Amadeo Avogadro, Vercelli, Italy

² Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Hasanuddin University, Makassar, Indonesia



Fig. 1 Intraoral preoperative image showing a hard blueish painful swelling in correspondence of the lingual side of the left mandibular body, extended to the oral floor

Case report

A 91-year-old male subject was referred for a swelling in the left body of the mandible.

The past medical history of the patient included the following conditions: diabetes, hypertension, chronic renal insufficiency, chronic obstructive pulmonary disease, and Alzheimer disease.

On clinical examination a painful swelling at the left area of the mandible was found. The patient was edentulous. Intraoral examination revealed a hard blueish swelling in correspondence of the lingual side of the left mandibular body, extended to the oral floor (Fig. 1). The poor collaboration of the patient prevented to obtain accurate information regarding this condition during the previous weeks.

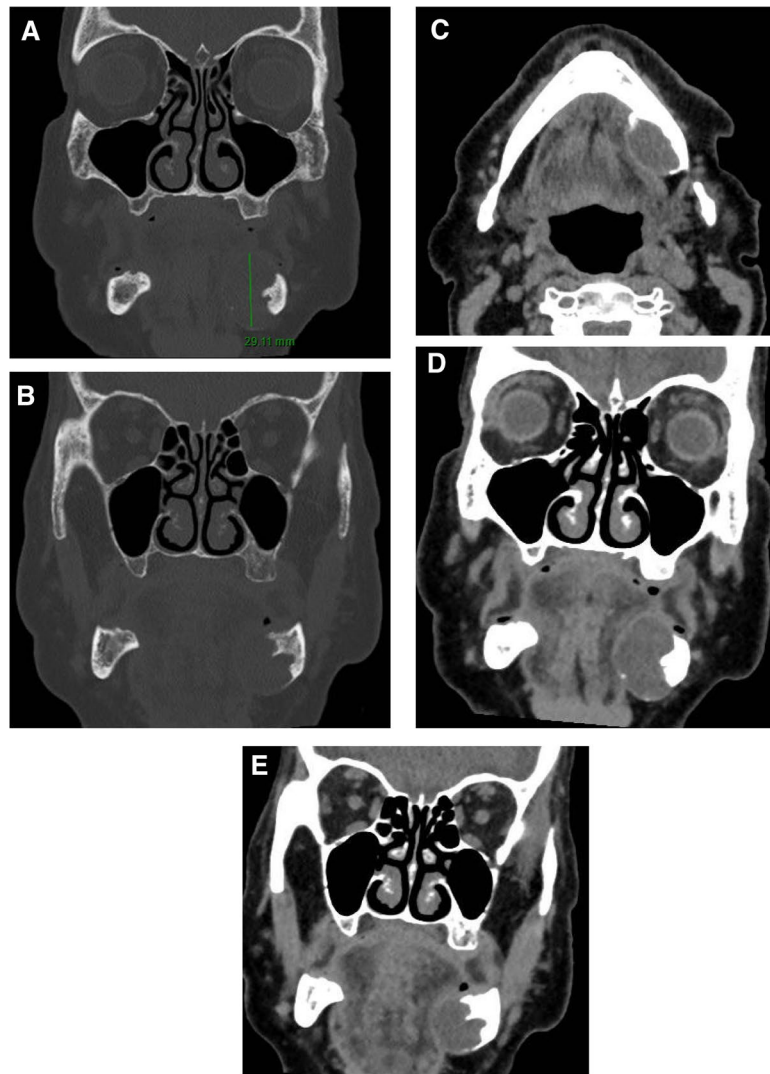


Fig. 2 CT scan revealing the presence of a well-defined, unilocular, expansile, radiolucent lesion with a thin sclerotic rim extending from the lingual portion of the left mandibular body to the oral floor

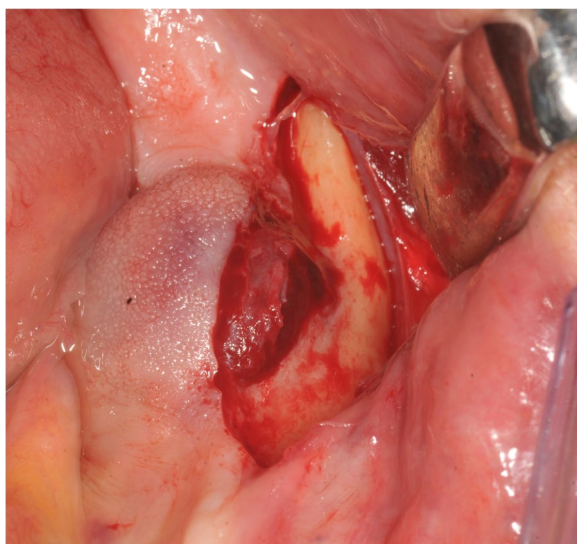


Fig. 3 Intraoperative image showing the cystic wall following the crestal incision in the left mandibular body region and the elevation of a mucoperiosteal flap

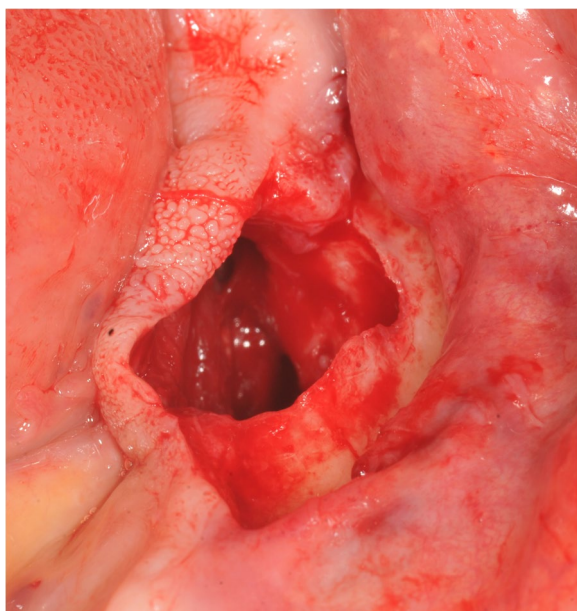


Fig. 4 Intraoperative image showing the completed en bloc enucleation of the cystic lesion

Therefore, it was decided to perform a CT scan, that revealed a well-defined, unilocular, radiolucent lesion extending from the lingual corticle of the left mandibular body to the oral floor (Fig. 2).

Due to the multiple comorbidities, a fine needle aspiration (FNA) followed by surgical excision by enucleation and curettage under local anesthesia was decided.

Under local anesthesia, a FNA of the lesion was executed, with the aspiration of a yellow liquid. Then, a crestal incision in the left mandibular body was performed and a mucoperiosteal flap was raised to reveal the cyst that underwent en bloc enucleation and curettage and that was sent for pathological examination (Figs. 3 and 4).

Pathological examination (Fig. 5) of the collected specimen showed a cyst wall bordered by odontogenic basaloid epithelium with regions of squamous change and a well-defined palisaded basal layer with overlying epithelial features resembling a net-like arrangement similar to stellate reticulum. Groups of ghost cells containing amorphous material was observed. These findings confirmed the diagnosis of a calcifying odontogenic cyst.

Postoperative course was uneventful. At 1 year follow up, the lesion did not recur.

Discussion

COCs are usually incidentally diagnosed following the execution of a panoramic radiograph. Nevertheless, the present case shows that COCs may also present as painful swellings needing an immediate treatment [2, 3, 10, 13, 16, 19, 22, 24–28].

Small COCs may be frequently painless so that they can be incidentally diagnosed following routine radiographs. When they are sited in the maxilla, they may be associated with specific symptoms, such as nasal stiffness, epistaxis, or headache [1–3, 6–10, 14–28].

COCs should be differentiated from other gingival pathologies that can be commonly found in the oral environment. In fact, such lesions usually do not involve the underlying bone with very few rare cases reported with absorption of the adjacent alveolar bone, adjacent tooth root resorption, and potential for tooth displacement. In this case, clinical differential diagnosis of exophytic oral lesion with soft tissue enlargement should include reactive, viral, neoplastic, to developmental lesions. For example, reactive lesions such as peripheral giant cell granuloma or pyogenic granuloma are inflammatory lesions that should be excluded [12–26].

At imaging, COCs are identified as well-defined unilocular or more rarely multilocular radiolucencies, with the possibility of scalloped borders. They can be associated with images compatible with tooth displacement or root resorption. On the other hand, extraosseous COCs may appear as gingival swellings, with symptoms of tenderness or pain. Multilocular form have been noted in 5% of cases, while calcifications, that are pathognomonic radiographic findings for COCs, have been observed in about 50% of all lesions [1–4, 19–24].

Radiological differential diagnosis includes the following: in its early stages of formation, COC shows very little mineralization or none at all. Therefore, it may

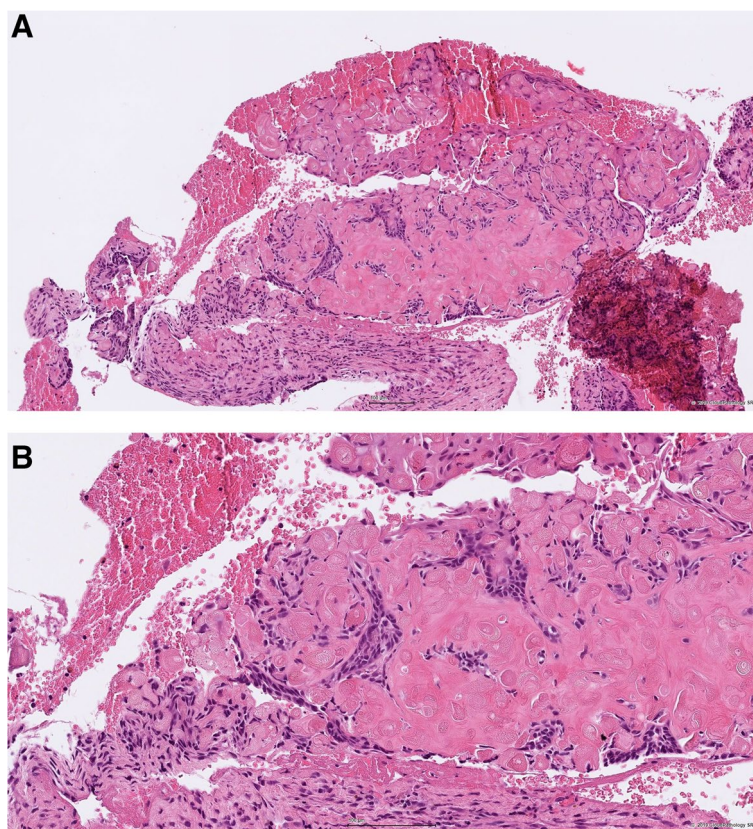


Fig. 5 Histological examination. Microscopic examination showing a cyst wall bordered by odontogenic basaloid epithelium with regions of squamous change and a well-defined palisaded basal layer with overlying epithelial features resembling a net-like arrangement similar to stellate reticulum. Groups of ghost cells containing amorphous material was observed. **A** HE $\times 10$; **B** HE $\times 20$

manifest with cyst-like characteristics such as radiolucency. In this case, it must be distinguished from: 1. Dentigerous cyst, 2. Odontogenic cyst, 3. Unicystic ameloblastoma. When a mixed radiolucent-radiopaque appearance is obtained in the later stages of development, it should be distinguished from 1. Adenomatoid odontogenic tumor, 2. Partially mineralized odontoma, 3. Calcifying epithelial odontogenic tumor. Additionally, ameloblastic fibro-odontoma should not be forgotten [1–14, 23–28].

Pathologically, COCs are made up of a cystic wall with a fibrous capsule. The key pathognomonic pathological finding is the basal layer of palisading columnar cells with an overlying layer that resembles the stellate reticulum of the enamel organ. Focal ghost cells are usually observed too, with possible calcifications. Differential diagnosis includes odontogenic keratocysts, adenomatoid odontogenic tumors, dentigerous cysts, ameloblastomas, calcifying epithelial odontogenic tumor, and ameloblastic fibro-odontoma [1–14].

Enucleation with curettage still represents the treatment of choice for COCs. Resection may be considered

in selected cases when an aggressive clinical behavior is observed or a high recurrence rate is suspected. A strict follow-up is advised to monitor eventual recurrences [1, 2, 4, 8, 12, 15, 19].

In large lesions, or when the patient is affected by severe comorbidities, conservative treatments such as decompression and marsupialization may still be proposed [4, 8, 12, 15, 19, 25, 28].

Conclusions

In conclusion, dental practitioners and oral surgeons should be aware of the behavior and management options of COCs in order to include it in the differential diagnosis of radiolucent lesions that they can face during their clinical practice.

Authors' contributions

A.M. collected the data and performed the analyses; PB wrote the main manuscript text. M.R. validated the results and the manuscript. All authors reviewed the manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations**Ethics approval and consent to participate**

Need of ethics committee approval was waived as a case report. The participant gave his informed consent.

Consent for publication

Written informed consent for publication was obtained from the participant.

Competing interests

The authors declare no competing interests.

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References

- Rajendra Santosh AB (2020) Odontogenic Cyst. *Dent Clin North Am* 64(1):105–119
- Ahmad SA, Popli DB, Sircar K, Hasan S (2022) Calcifying odontogenic cyst: report of an uncommon entity with a brief literature review. *J Oral Maxillofac Pathol* 26(1):131
- Rojo R, Prados-Frutos JC, Gutierrez Lázaro I, Herguedas Alonso JA (2017) Calcifying odontogenic cysts. *J Stomatol Oral Maxillofac Surg* 118(2):122–124
- Samir MC, Lamiae G, Bassima C (2021) Calcifying odontogenic cyst of anterior maxillary: case report and review. *Int J Surg Case Rep* 85:106267
- Borrás-Ferrerres J, Albisu-Altolaquirre I, Gay-Escoda C, Mosqueda-Taylor A. Long-term follow-up of a large multilocular odontogenic keratocyst. Analysis of recurrences and the applied treatments. *J Clin Exp Dent*. 2024;16(9):e1157–e1163.
- Cunha JLS, Martins SDS, Barros EF, Cavalcante IL, Barros CCDS, Turatti E, Cavalcante RB, Fonseca FP, Alves PM, Nonaka CFW, de Andrade BAB (2024) Cystic lesions and odontogenic tumors in older people: a Brazilian multicenter study. *J Clin Exp Dent* 16(10):e1183–e1192
- Udompatanakorn C, Patcharaman S, Taebunpakul P (2024) The expression of Methyltransferase-like 3 in dentigerous cyst and ameloblastoma. *J Clin Exp Dent* 16(12):e1481–e1488
- Boffano P, Ruslin M (2025) Stafne bone cavity: a systematic review. *J Clin Exp Dent* 17(6):e725–e731
- Li Y, Xie Q, Li C, Yang Q, Zhang Z, Yang C, Xu G (2024) Long-term investigation of minimally invasive alcohol-based therapy as the treatment of odontogenic keratocyst: a retrospective cohort study. *J Craniomaxillofac Surg* 52(3):324–333
- Brooks JK, Sultan AS, Rabkin MP, Sands JM, Everett DE, Price JB, Basile JR (2024) Recurrent peripheral odontogenic keratocyst: review of the literature and presentation of a novel case initially masquerading as an atypical infected lateral periodontal cyst. *J Stomatol Oral Maxillofac Surg* 125(4S):101540
- Li SR, Li DW, Man QW (2024) Proteomic profile of tissue-derived extracellular vesicles from benign odontogenic lesions. *J Stomatol Oral Maxillofac Surg* 125(4S):101921
- Zhou H, Li RF, Man QW (2025) Bioinformatics analysis of hub genes and oxidative stress-related pathways in odontogenic keratocysts. *J Stomatol Oral Maxillofac Surg* 10:102423
- Rarasati SA, Sylviana M, Sjamsudin E (2025) Conservative approach in the management of dentigerous cyst and horizontal impaction tooth through marsupialization: case report. *J Dentomaxillofac Sci* 10(1):72–76
- Dangore-Khasbage S (2024) Dentigerous cyst with a diagnostic dilemma: A case report. *J Dentomaxillofac Sci* 9(2):139–142
- Bilodeau EA, Collins BM (2017) Odontogenic cysts and neoplasms. *Surg Pathol Clin* 10(1):177–222
- de Arruda JAA, Monteiro JLGC, Abreu LG, de Oliveira Silva LV, Schuch LF, de Noronha MS, Callou G, Moreno A, Mesquita RA (2018) Calcifying odontogenic cyst, dentinogenic ghost cell tumor, and ghost cell odontogenic carcinoma: a systematic review. *J Oral Pathol Med* 47(8):721–730
- Yeh TH, Chen YC, Lee YP, Chiang CP (2022) Calcifying odontogenic cyst treated by marsupialization and subsequent total enucleation. *J Dent Sci* 17(2):1076–1078
- Akshatha BK, Manjunath GS, Soundarya N (2023) Calcifying odontogenic cyst associated with compound odontoma - a rare entity. *J Oral Maxillofac Pathol* 27(Suppl 1):S69–S74
- Tseng CH, Wang WC, Chen YF, Chen YK (2023) Calcifying odontogenic cyst coexists with adenomatoid odontogenic tumor and peripheral cemento-osseous reactive proliferation. *J Dent Sci* 18(4):1889–1891
- Yeh TH, Chen YC, Lee YP, Chiang CP (2023) Recurrent hybrid odontogenic tumor of calcifying odontogenic cyst and ameloblastic fibroma. *J Dent Sci* 18(2):933–935
- Oh KY, Kim JH, Yoon HJ (2024) Calcifying odontogenic cyst demonstrates recurrent WNT pathway mutations and so-called adenoid ameloblastoma-like histology: evidence supporting its classification as a neoplasm. *Mod Pathol* 37(6):100484
- Bezerra HKF, Dutra MJ, Roza ALOC, de Freitas SV, Kaminagakura E, Anbinder AL, Vazquez-Garduño M, Rojas-Alcayaga G, Espinoza-Santander IL, Pinto AVO, Farias DM, Carvalho EJA, de Castro JFL, Lopes MA, Santos-Silva AR, Robinson L, Abrahão AC, Romañach MJ, van Heerden W, Mosqueda-Taylor A, Vargas PA, Perez DEDC (2025) Calcifying odontogenic cyst: a detailed international multicentric study. *Oral Surg Oral Med Oral Pathol Oral Radiol* 140(1):100–112
- Shi D, Dong H, Chen B, Zhu Z, Zhang T (2024) Decompression-first or direct enucleation: the choice of treatment for medium-sized odontogenic jaw cysts. *J Stomatol Oral Maxillofac Surg* 125(4S):101892
- Chu T, Qin Q, Liu K, Zhao Y, Fu Y, Liu Q (2024) Enucleation of jaw cyst combined with intentional replantation to retain cyst-involved teeth. *J Stomatol Oral Maxillofac Surg* 125(4):101731
- Teerawong C, Chulaksanadecha T, Anansila T, Krasaetanont P, Intapa C, Chompunud Na Ayudhya C. Concordance between clinical and histopathological diagnoses of oral and maxillofacial lesions in Thailand: a 20-year retrospective study. *J Clin Exp Dent*. 2025;17(7):e834–e839.
- Permana H, Ruslin M, Yusuf ASH, Gazzali M, Fauzi A, Shimo T, Boffano P, Forouzanfar T (2024) Surgical management of dentigerous cyst arises from ectopic tooth: a report of three consecutive cases and literature review. *J Stomatol Oral Maxillofac Surg* 125(3):101685
- Ruslin M, van Trikt KN, Yusuf AS, Tajrin A, Fauzi A, Rasul MI, Boffano P, Forouzanfar T (2022) Epidemiology, treatment, and recurrence of odontogenic and non-odontogenic cysts in South Sulawesi, Indonesia: a 6-year retrospective study. *J Clin Exp Dent* 14(3):e247–e253
- Boffano P, Cavarra F, Tricarico G, Masu L, Bruccoli M, Ruslin M, Forouzanfar T, Ridwan-Pramana A, Rodríguez-Santamarta T, Rui Ranz M, de Vicente JC, Starch-Jensen T, Pechalova P, Pavlov N, Doykova I, Konstantinovic VS, Jelovac D, Barrabé A, Louvrier A, Meyer C, Tamme T, Andrianov A, Dovšak T, Birk A, Hresko A, Chepurnyi Y, Kopchak A, Snäll J, Hagström J, Rasmusson L, Rocchetti V (2021) The epidemiology and management of ameloblastomas: a European multicenter study. *J Craniomaxillofac Surg* 49(12):1107–1112

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