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CEMENTOBLASTOMA: REVISITING YET ANOTHER RARE CASE

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ABSTRACT

Cementoblastoma is a rare benign odontogenic tumor characterized by the formation of a mass of cementum or cementum-like tissue attached to the roots of a tooth. It is derived from ectomesenchyme. It is characterized by calcified cementum-like deposits produced by cementoblasts fused with the tooth root. In this article we report a case of cementoblastoma in a 20 year old male patient with brief review of literature.

KEYWORDS: Cementoblastoma, Odontogenic tumor, Radiopaque lesion.

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INTRODUCTION

The cementoblastoma also known as true cementoma is a rare, benign neoplasm of cementoblasts. The transformed cementoblasts produce a mass of cementum (or cementum-like material) fused to the root surface of a tooth. Cementoblastoma shares many histopathologic similarities with osteoblastoma. However, the former is clearly odontogenic, whereas the latter is osseous in origin. It was first recognized first by Dewey in 1927, its prevalence is higher in young male adults under 30 years of age, and it accounts for less than 1–6.2% of all odontogenic tumors. Pain and swelling are the most common findings in the patients. Radiographically, a radiopaque mass is usually attached to the apices of the roots of the teeth. Histologically, it appears as irregular trabeculae of cementum enclosed by cementoblasts and radiating trabeculae at the periphery with well-defined borders with vascularised fibrous tissue.[1,2]

CASE REPORT

A 20-year-old male patient came to the department of Oral and Maxillofacial surgery with pain and swelling in the right lower posterior region since 45 days. No relevant past medical or maxillofacial trauma history was reported. Extraoral examination revealed a diffuse swelling involving right lower one third of face, which was tender and bony hard on palpation. (Fig:1) Intraorally, the lesion was extending from right mandibular first molar to mesial aspect of mandibular second molar, showing mild obliteration of the buccal vestibule. Vitality of all the teeth associated with the lesion was negative by electric pulp testing.

Orthopantomogram showed a mixed radiolucent–radiopaque mass with well-defined radiolucent rim in relation to the right permanent mandibular first and second molars, which further led to resorption of distal root of right mandibular first molar and mesial root of mandibular second molar. (Fig:2)

The CBCT scan of mandible of the patient revealed well-defined radiopaque mass with corticated borders surrounded by thin radiolucent rim in relation to the apices of right mandibular first and second molar tooth. (Fig:3) Based on history, clinical findings and radiological findings, provisional diagnosis of cementoblastoma, PCOD, sclerosing osteitis and fibrous dysplasia was made. The differential diagnosis included juvenile ossifying fibroma, hypercementosis, condensing osteitis, fibro-osseous lesions, ameloblastoma, and osteoblastoma.

Macroscopically, it presented a hard ovoid to round mass with firm consistency measuring 01 cm × 01 cm in diameter.(Fig:4) Microscopically, it showed calcified cementum-like tissue which was basophilic, and in-between fibrovascular stroma with blood vessels were identified. At few places, lining by cementoblasts were seen which were also found scantly in the stroma. (Fig:5,6,7).

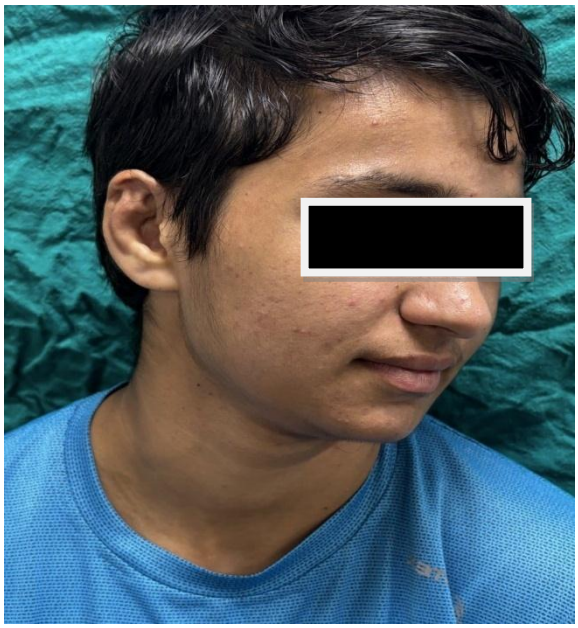

Fig. 1: Diffuse swelling involving right lower one third of face.

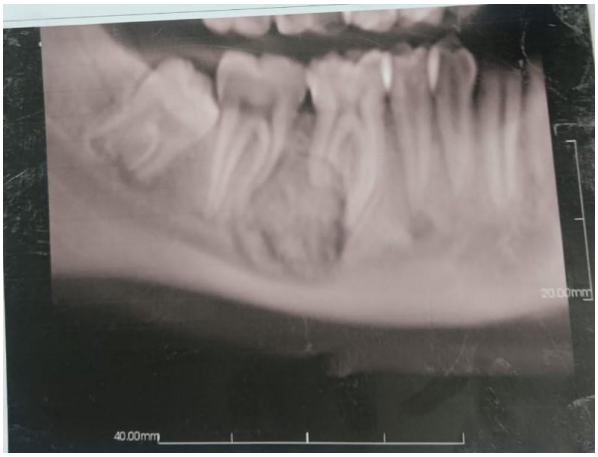

Fig. 2: Mixed radiolucent–radiopaque mass with well-defined radiolucent rim.

Fig. 3: Well-defined radiopaque mass with corticated borders surrounded by thin radiolucent rim in relation to the apices of right mandibular first and second molar tooth.

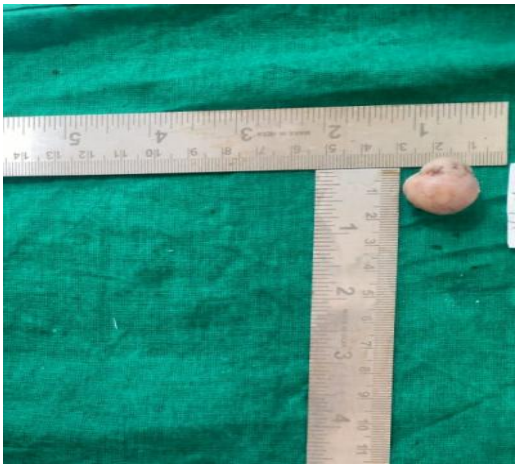

Fig. 4: Hard round mass with firm consistency.

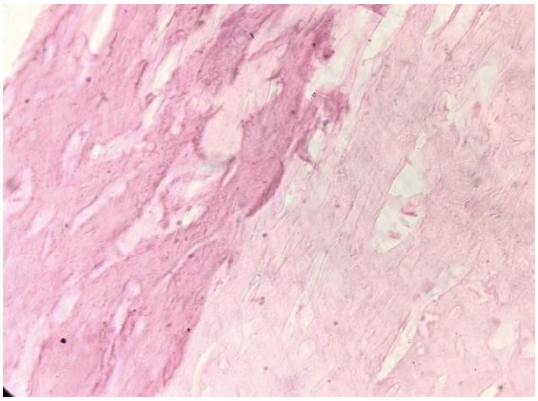

Fig. 5: Calcified Cementum-like tissue.

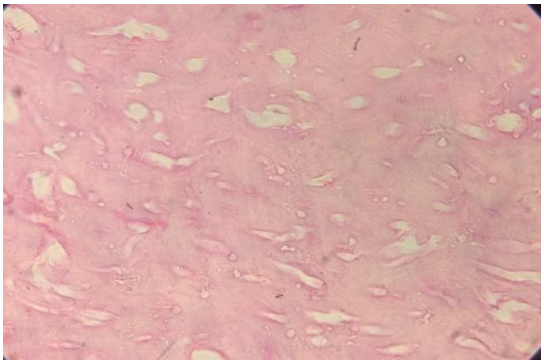

Fig. 6: Cementoblasts found scantly in the stroma.

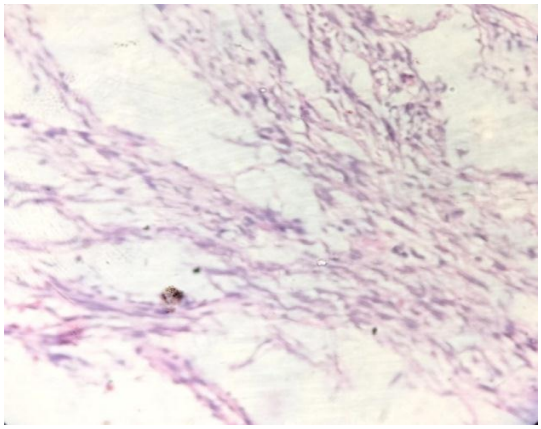

Fig. 7: Fibrovascular stroma with blood vessels.

DISCUSSION

Cementoblastoma's history traces back to early descriptions of tooth-related masses, with Dewey officially describing it in 1927. Metnitz of Vienna gave complete description of Cementoblastoma (1888) and Bland-Sutton (1906) provided the first radiographic evidence of CB. Initially misclassified as radicular odontome, it's now known as a rare, benign neoplasm of cementum, usually affecting young people and the mandibular first molar, characterized by a cementum mass attached to a tooth root, requiring surgical removal for definitive diagnosis and treatment.[3,4] Cementoblastoma also called as true cementoma was first recognized by Norberg in 1930.[5] The incidence is unknown. Various large-scale studies have reported the relative frequency of cementoblastoma among odontogenic tumors to range from 0.1 % to 4.2 %.[6] The tumor often affects young individuals, with an average age at diagnosis of 21 years. There is a slight male predilection, with a male-to-female ratio of 1.4:1. The majority of cases (80 %) arise in the mandible, most often in association with a permanent mandibular first molar. All these features were also seen in our case. Deciduous tooth involvement is uncommon. Incisor involvement is extremely rare, comprising less than 2 % of cases. Development of a cementoblastoma in association with an impacted or unerupted tooth has been described in a few unusual cases. Multifocal involvement is possible but extremely rare.[6] When the lesion size is small in the early stages, cementoblastoma may remain asymptomatic. The associated tooth usually tests vital. As the lesion progresses in size, patients may present with pain and swelling in the perioral region surrounding the implicated tooth, resulting in facial asymmetry. With further enlargement, the tumor may extend both buccally and lingually, causing erosion and potential destruction of the jaw bone cortex. This process can lead to displacement of adjacent teeth, ultimately progressing to invasion of the pulp and root canals. Pathologic jaw fracture, and expansion of the inferior border of the mandible have been described in a few cases.[7]

Radiographically, cementoblastoma is a cementum like well-defined, circumscribed mass fused to one or more roots of the permanent tooth, resulting in root resorption, loss of the root outline, and obliteration of the periodontal ligament space. In the case presented herein, the lesion involving the tooth presented as a mass with a distinct radiolucent rim with buccolingual cortical thinning and expansion. The radiopacity showed a thin radiolucent band around the cementoblastoma that was more distinctive and uniform than in other lesions such as cemental dysplasia. As the lesion matures, the differential diagnosis should include odontoma, osteoblastoma,

cemental dysplasia, hypercementosis, and sclerosing osteitis. Odontoma is not attached to the root and typically shows a tooth-like and heterogeneous density with a follicular space.[8] Osteoblastoma does not show tooth-mass continuity and has a more irregular pattern of radiopacity than benign cementoblastoma. Due to osteolytic changes, the majority of the patients with osteoblastoma present with persistent pain.[6] Hypercementosis is a small lesion surrounded by a thin periodontal membrane space with no signs of root resorption, pain, or jaw expansion. Sclerosing osteitis is a well-defined radiopaque lesion that typically appears without any peripheral radiolucent rim, and is therefore easily differentiated from cases of cementoblastoma that usually show a distinct rim. These salient features are crucial for distinguishing cementoblastoma from other lesions.[9]

Histologically, cementoblastoma is characterized by masses of hypocellular cementum embedded in a fibrovascular stroma with prominent cementoblastic rimming. Another characteristic feature is the formation of prominent basophilic reversal lines within the cementum giving the lesion a Pagetoid appearance. Multinucleated osteoclast-type giant cells and plump cementoblasts may be present within the fibrovascular stroma. At the periphery of the lesion, there is a rim of connective tissue and commonly radiating columns of cellular unmineralized tissue that accounts for the radiographic radiolucent zone. Although the cytologic features of the cementoblasts and cementoclasts, particularly in the peripheral cellular zone, may have considerable pleomorphism, mitotic figures are not seen.[10]

Immunophenotypic data is limited. Gao et al. observed immunoreactivity for bone morphoge netic protein (BMP) in five cases of cementoblastoma, as well as in other odontogenic tumors with dental hard tissue formation.[11] Arzate et al. aimed to address the lack of specific cementum biomarkers by evaluating expression of a cementoblastoma-conditioned medium-derived protein in human periodontal tissues, periodontal ligament, alveolar bone, and cementoblastoma-derived cells. They observed immunoreactivity for this protein among acellular and cellular cementum, cementoblasts, cementocytes, cells within the endosteal spaces of alveolar bone, and periodontal ligament cells adjacent to blood vessels.[12] Alvarez-Pérez et al. identified a gene encoding a novel human cementum-derived protein CP-23 (cementum-protein-23). These investigators detected high expression levels of CP-23 mRNA by reverse transcriptase polymerase chain reaction (RT-PCR), northern blot analysis, and in situ hybridization in cementoblastoma- and periodontal ligament derived cells.[13] Cementoblastomas and osteoblastomas share a common molecular pathogenesis that is based on the occurrence of FOS gene rearrangements and FOS overexpression, suggesting that both entities form a spectrum of the same disease localized at the tooth root. The FOS gene is part of the FOS gene family, which is involved in the formation of transcription factor complex activator protein 1. FOS protein binds to the promoter and enhancer regions of target genes and regulates cell proliferation, differentiation, and transformation.[13]

Complete surgical excision of the lesion along with the involved tooth to prevent recurrence is mandatory for complete definitive diagnosis. Conservative management, such as curettage alone, is discouraged due to high recurrence rates, which have been reported to be as high as 37%.[14]

CONCLUSION

Cementoblastoma ia a rare odontogenic tumor which continues to be an infrequent entity that particularly affects young patients under the age of 30. The sex distribution shows a slight tendency for being more common in males. The most frequently effected area is the mandibular molar-premolar region. Pain, expansion and radiographic radiopacity surrounded by a peripheral radiolucent halo are the most striking features. Recurrence rate as high as 37.1% has been reported if there has been an incomplete excision.

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