Case Report

Focal cemento-osseous dysplasia

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Abstract Focal cemento-osseous dysplasia (FCOD) is a benign fibro-osseous lesion of bone characterized by the replacement of normal bone by fibrous tissue and subsequently followed by its calcification with osseous and cementum-like material. It is mostly asymptomatic in nature and requires no treatment. When secondarily infected, it becomes symptomatic and intervention is required. Here, we report a case of symptomatic FCOD of mandible in a 52-year-old female patient. Histopathological evaluation of the biopsy specimen by ground sections and decalcified sections aided in the final diagnosis of the case.

Keywords: Cementum, decalcification, dysplasia, fibro-osseous, ground section

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INTRODUCTION

Cemento-osseous dysplasia (COD) is a benign fibro-osseous lesion which encompasses three subgroups, namely periapical, focal and florid.[1] Periapical lesions are frequently found in association with the apex of vital mandibular anteriors. Focal variants are commonly found in the mandibular molar regions.[2] Florid lesions are multifocal in nature and involves both maxilla and mandible, commonly in the posterior region, and occasionally show bilaterally symmetrical distribution.[3]

Majority of these lesions are asymptomatic and are usually detected as an incidental finding in a radiograph and requires no treatment. Sometimes, when secondarily infected due to improper endodontic treatment or extraction of a tooth or any other cause, these lesions may become symptomtic, following which it has to be surgically excised.[4] Histopathological evaluation of these symptomatic lesions aid in the definitive diagnosis.

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Here, we report a case of focal COD (FCOD) diagnosed in our institution. Although many literature are available on the clinical and radiographic details of the lesion, not much of information are available on the histological aspects, especially of the osseous and cementum-like areas comprising the lesion. This case report emphasizes the histological aspects of the calcified areas of the lesion with the help of ground sections and decalcified sections.

CASE REPORT

A 52-year-old female patient reported to our outpatient department with a chief complaint of pain in the back teeth region of the right lower jaw for the past 6 months. The patient underwent extraction of the lower right back tooth 2 years ago and developed pain in that region for the past 6 months. The pain was dull, intermittent, radiating in nature and relieved with medication. Intraoral examination revealed clinically missing 46 and the overlying mucosa appeared normal [Figure 1]. Orthopantamogram

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revealed a well-defined radiopaque mass measuring about 1.5 cm × 2 cm in the right mandible extending from the distal root of 45 to the mesial root of 47 [Figure 2]. On the basis of clinical and radiographic findings, a provisional diagnosis of complex odontoma was given.

Surgical excision of the lesion was done and 11 small fragments of hard-tissue specimen were submitted for histopathological evaluation [Figure 3]. The specimens were subjected to decalcification and ground section procedures.

Ground section was done by manual grinding method in two steps: first with rough carborundum stone till a section of 2–3 mm was obtained and then on static carborundum stone with hand till a thickness of 1 mm was obtained. Grinding was further done using fine carborundum stone till a section thickness of 0.25 mm was achieved. The ground section was then cleaned, dried and mounted on the slide using dibutylphthalate polystyrene xylene (DPX) and viewed under a microscope.[5]

Decalcification was done using 10% aqueous solution of formic acid, as it is gentler in action unlike nitric acid or hydrochloric acid and less likely to interfere with nuclear staining. After decalcification, extensive washing in tap water was done to remove residual acids from the specimen followed by the standard tissue processing and staining procedure.[6]

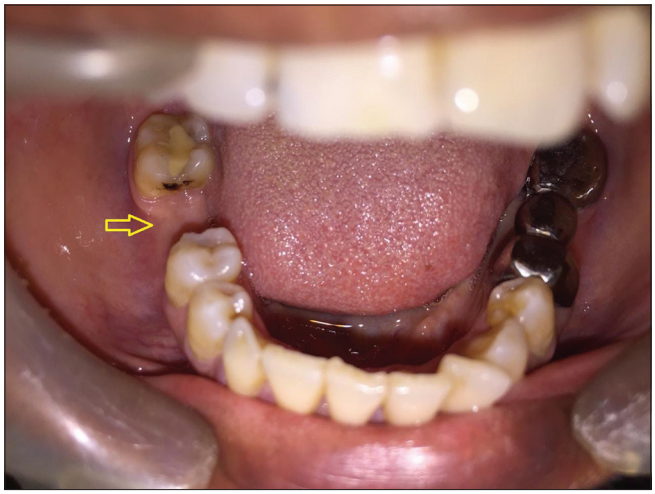

Figure 1: Intraoral photograph showing clinically missing 46

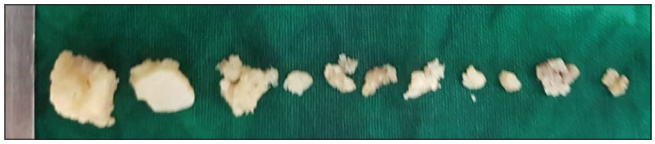

Figure 3: Photograph showing macroscopic appearance of surgically excised specimen

On microscopic examination, the ground section revealed large areas of tissue resembling bone with osteons and central Haversian canals [Figure 4].

The hematoxylin and eosin-stained decalcified sections revealed delicate fibrocellular connective tissue stroma with collagen fibers, spindle-shaped fibroblasts and numerous vascular spaces. Within the connective tissue stroma were seen numerous basophilic masses of material resembling bone with osteocytes and globules resembling cementum [Figures 5-7].

Based on the histopathological findings and correlating with clinical and radiographic features, a final diagnosis of "Focal cemento-osseous dysplasia" was made.

DISCUSSION

Fibro-osseous lesions are benign entities possessing both fibrous and osseous components and include reactive, neoplastic and dysplastic processes. Focal

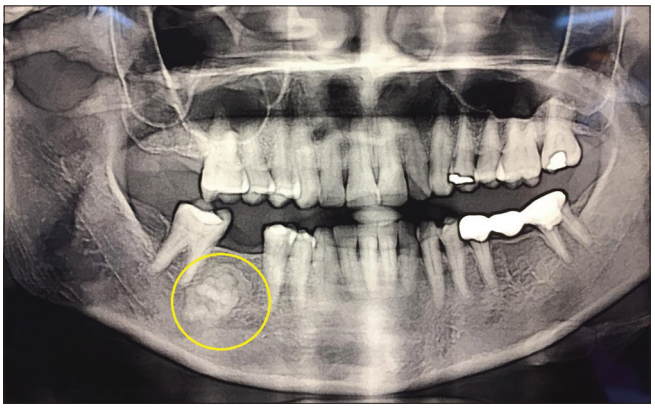

Figure 2: Orthopantamogram showing a well-defined radiopaque mass in the right mandible region extending from the distal root of 45 to the mesial root of 47

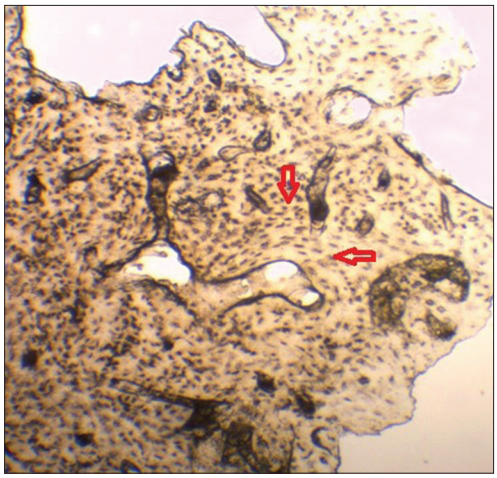

Figure 4: Photomicrograph of ground section showing the presence of osteons with Haversian canals (low-power magnification)

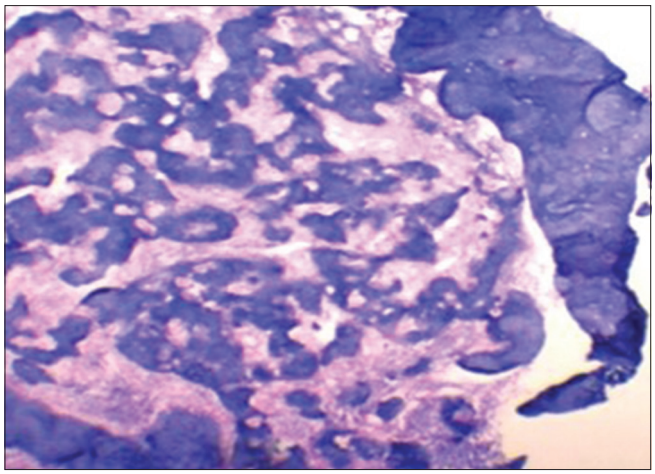

Figure 5: Low-power magnification of H&E-stained decalcified section showing areas of bone and basophilic globular masses resembling cementum within a delicate fibrocellular connective tissue stroma.

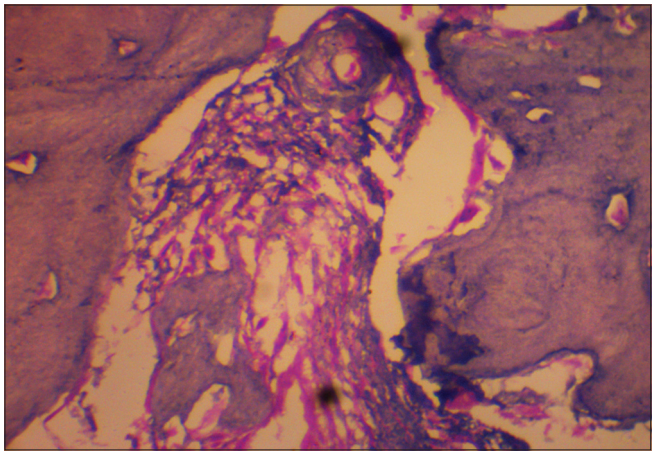

Figure 6: High power magnification of H&E stained decalcified section showing bone with osteocytes within lacunae and delicate fibrocellular connective tissue stroma with vascular spaces

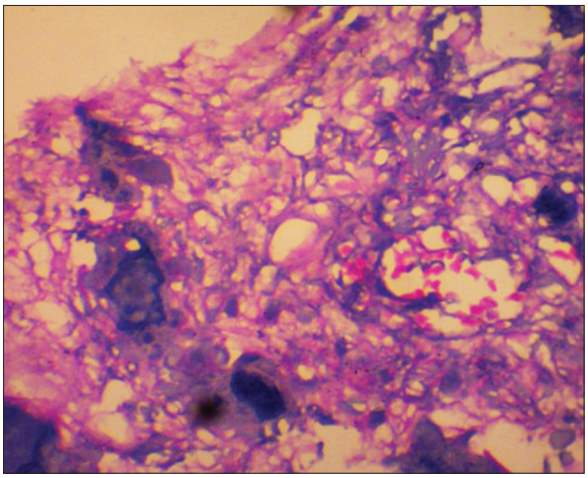

Figure 7: Low-power magnification of H&E-stained decalcified section showing the presence of basophilic globules of cementum, delicate fibrocellular connective tissue stroma with dispersed capillaries

osseous dysplasia, also known as FCOD, represents the most common benign fibro-osseous lesion.[7,8] Waldron, observing its localized nature, first reported it as the "localized fibro-osseous-cemental lesion," whereas Summerlin and Tomich renamed as "focal cemento-osseous dysplasia."[9,10]

The peak age of incidence is from third to fifth decade occurring commonly in female patients, especially the Africans-Americans.[11,12] FCOD is usually asymptomatic, self-limiting reaching an average size of 1.5 cm. Mandible (86%) is the most frequent site of occurrence. It occurs commonly in regions of extractions. Local jaw expansion and mild discomfort may be reported in about one-third of the patients.[13]

Etiopathogenesis of FCOD remains still unclear and considered to be reactive or dysplastic lesion.[12] It is thought to be of periodontal ligament origin[7] or due to defect in extraligamentary bone remodeling influenced by local and systemic factors.[12]

Radiology has been of central importance to the detection of at least 64% of FCODs.[10] Ariji *et al*. first applied computed tomography (CT) to a COD series.[3] Modern cone-beam CT imaging has provided the dentist with the detailed three-dimensional extent of the lesion aiding in proper diagnosis.

FCOD is known to have three developmental stages. Radiographically, the early or osteolytic stage shows a well-defined radiolucent area with loss of periodontal ligament and lamina dura. Intermediate or cementoblastic stage shows small opacities which appear within the radiolucent area due to the deposition of cementum-like droplets in the fibrous tissue. Mature, osteosclerotic and "inactive" stage shows radiopacity, present in the major part of the lesion.[10]

In the present case, the lesion was detected radiographically in the extracted 46 region with pain as a presenting feature. The lesion was radiopaque with well-defined borders surrounded by radiolucent line, suggesting mature or osteosclerotic stage of FCOD or complex odontoma.

The diagnosis of asymptomatic FCOD is usually based on clinical and radiological features. The differential diagnosis of early stage of FCOD includes periapical granuloma or cyst and chronic osteomyelitis, whereas in the mixed and radiopaque stages, chronic focal sclerosing osteomyelitis, ossifying/cementifying fibroma, odontoma and osteoblastoma should be considered.[14]

Ossifying fibroma is usually encapsulated, which tends to separate clearly on surgical excision and removed in one large mass.[15] Microscopically, it shows delicate bony trabeculae with prominent osteoblastic rimming and shows intimate association with adjacent stroma.[11] As these findings could not be appreciated in the present case, ossifying fibroma was excluded from the differential diagnosis.

Cementoblastoma is usually seen attached to the tooth root and causes difficulty in extraction of the tooth. However, in the present case, the lesion was found in relation to missing 46 (previously extracted without difficulty); thus, cementoblastoma was ruled out.

Another radiographic differential diagnosis to be considered in the present case was the complex odontoma as it is most commonly seen in the mandibular posterior region as an amorphous hyperdense mass that does not resemble the teeth.[11] A definitive diagnosis can be obtained only after histopathological evaluation.

Another differential diagnosis that was considered was chronic focal sclerosing osteomyelitis, a primary inflammatory condition of the bone in response to a dental infection. The lesion is usually seen as a well-localized radiopaque mass of sclerotic bone in relation to the apex of the offending tooth.[11] However, in our case, the lesion was surrounded by a well-defined radiolucency unlike chronic focal sclerosing osteomyelitis where the radiopaque mass blends with the surrounding bone.

Histopathology of FCOD comprises highly cellular fibrovascular connective tissue interspersed with numerous islands of woven or lamellar bone and globular calcifications resembling cementum.[11,12] Early lesions show more connective tissue stroma and mature lesions reveal large curvilinear bony trabeculae or lobular masses of cementum.[7,12] The histopathology of the present case was that of a mature lesion with numerous bony trabeculae and globules of cementum.

Although a provisional diagnosis of complex odontoma was given, neither the ground section revealed the presence of enamel, dentin and cementum, nor the decalcified sections revealed dentin tubules and pulp tissue inclusions. Thus, a final diagnosis of focal cemento-osseous dysplasia was given.

CONCLUSION

Focal cemento-osseous dysplasia is one of the most commonly encountered cemento-osseous dysplasias. Asymptomatic cases are often diagnosed as an incidental finding. Knowledge of clinical and radiographic features in conjunction with histopathology helps in definitive diagnosis. Treatment is not required unless symptomatic and prognosis is good.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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