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Imageological Diagnosis of Cemento-Ossifying Fibroma with Special Reference to CBCT: A Case Report

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Abstract: *Cemento-ossifying fibroma is a type of benign fibro-osseous lesion with odontogenic in origin and belonging to the same category as fibrous dysplasia and cementifying dysplasia. The histopathologic findings alone may be similar to other pathologies therefore accurate diagnosis requires careful clinical & radiological correlation. Nowadays, CBCT provides information for diagnosis as well as it guides in surgical planning. Here, we are presenting a case report of cemento-ossifying fibroma in an adult lady in her 4th decade of life with clinical findings of growth, present in the lower left jaw and explaining the role of CBCT in their diagnosis.*

Key Word: ***Cemento-ossifying fibroma, Fibro-osseous lesion, Cone beam computed tomography.***

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I. Introduction

Cemento-ossifying fibroma (COF) is a type of benign neoplastic fibro-osseous lesion which consist of highly cellular fibrous tissue containing variable amount of mineralized material resembling bone and /or cementum or both. [1] COF commonly occur in patients with their second to fourth decade of life with a definite female predilection and mandible is involved far more often than maxilla, especially the premolar and molar region.[2]

The origin of COF is not clearly understood but according to some authors have considered these lesions has been been associated with the periodontal membrane that has multipotent cells capable of forming cementum, lamellar bone, and fibrous tissue.[3]

The present paper describe a case of COF of the mandible in a 45 years old female with clinical, imageological and histopathological features and also explaining the role of CBCT in the diagnosis of COF from those lesions that exhibit similar internal calcification on conventional radiography, would be more accurate on CBCT.

II. Case Report

A female aged 45 years old reported to the outpatient Department of Oral Medicine and Radiology with clinical findings of growth in the left posterior mandibular region since 6 months. The growth developed 6 months earlier which gradually increased to the present size. No significant past dental and family history. She was a known case of diabetes mellitus and hypertension since 10 years and on medication for the same.

A] Clinical findings:

On clinical examination revealed an asymptomatic intraoral growth with irregular in shape, red in color, size approximately measured 4x3 cm, situated in the left mandibular posterior region (figure-2, 3). The growth was extending from 36 to 38 region with mobile and buccally diplaced 37 noted (figure2, 3). The growth was firm in consistency, nontender and the surface was ulcerated with marked teeth indentations noted and the borders were irregular, everted margins and there was no compressibility or depressibility noted.

Figure: 1 Extraoral profile of the patient

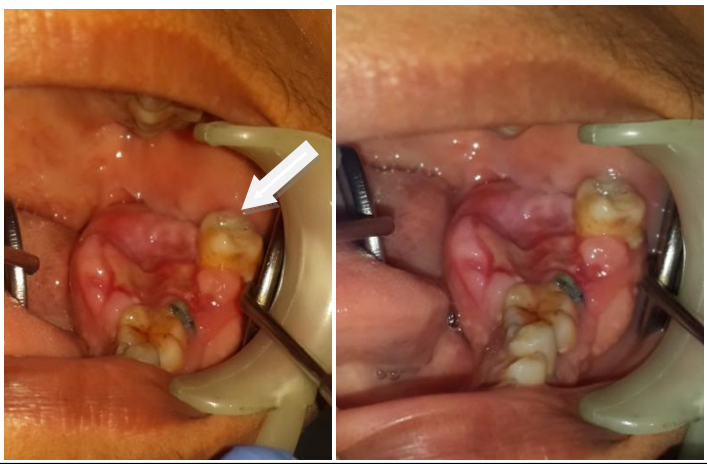

Figure: 2, 3 Intraoral view of the patient with displaced tooth 37 (white arrow)

B] Imageological Findings:

For radiographic evaluation the patient was subjected to a series of conventional radiographs, panoramic view and cone beam computed tomography (Mandible) scan.

1. PANORAMIC VIEW:

Panoramic view revealed mixed radiolucent- radiopaque lesion with well demarcated thin radiolucent line involving to the left posterior mandibular region extending from distal aspect of 36 to mesial aspect of 38 and from the crest of alveolar ridge to the inferior border of the mandible and internal structure of lesion shows radiopacities with coalescing foci of mineralization. The image shows displacement of teeth 36 which is tilted mesially and extruded tooth 37 noted (figure: 4)

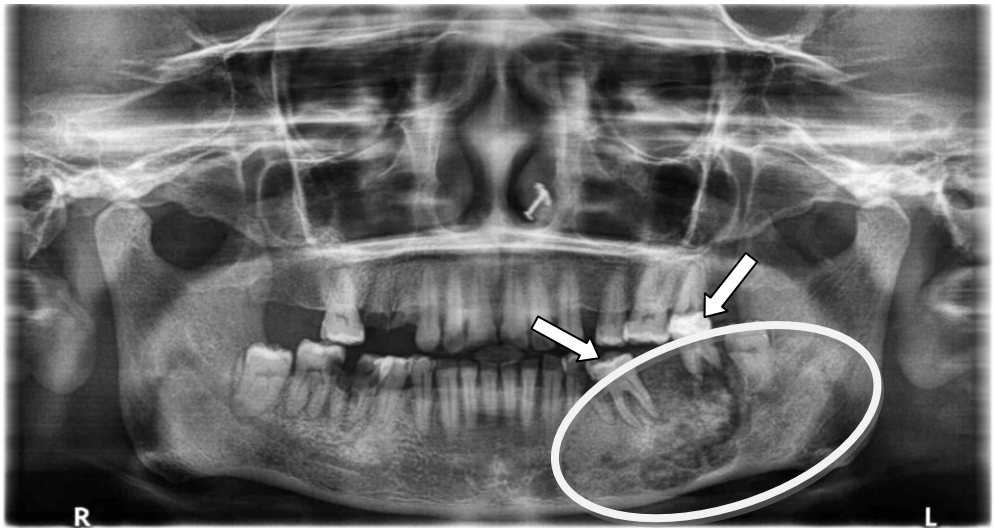

Figure-4 Panoramic view reveals a mixed radiolucent- radiopaque lesion involving to the left mandibular posterior region (white circle) extending from distal aspect of 36 to mesial aspect of 38 and from the crest of alveolar ridge to the inferior border of the mandible with displaced tooth 36 and extruded tooth 37 noted (white arrow).

2. CBCT (Mandible) view:

CBCT mandible view demonstrated in 3 sections [a. Axial section, b. Coronal section and c. Saggital section] in which axial section (figure: 5) revealed well demarcated radiolucency with size of anteroposteriorly 27mm and buccolingually 20.6mm with thining of buccal and lingual cortex.

Coronal section (figure: 6) revealed buccolingual expansion with thining of inferior border of mandible and displacement of 37 was noted. Saggital section (figure: 7) revealed radiopacities seen within the cortex with downward displacement of mandibular canal.

3D reconstructed view (figure: 8, 9- buccal and lingual aspect of the left mandible posterior region) revealed extension of the lesion with mesially tilted tooth 36, extruded tooth 37 and downward displacement of mandibular canal.

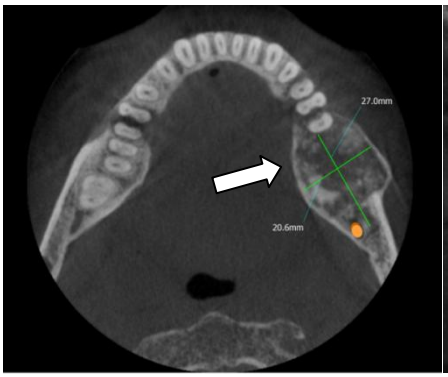

Figure- 5 axial section revealed well demarcated radiolucency (white arrow) with buccolingual expansion.

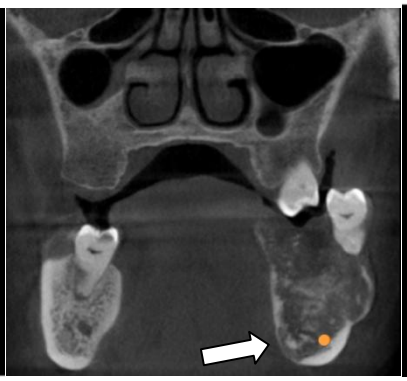

Figure- 6 Coronal section revealed thining of inferior border of mandible (white arrow) and displaced tooth 38 noted

Figure- 7 Saggital section revealed radiopacities seen within the cortex with downward displacement of mandibular canal

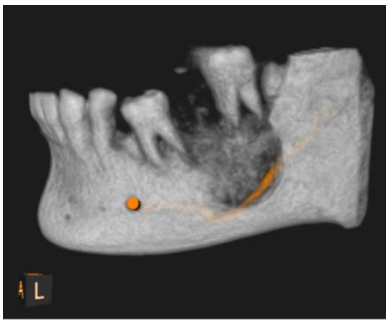

Figure- 8 3D Reconstructed view of buccal aspect of left posterior mandibular region.

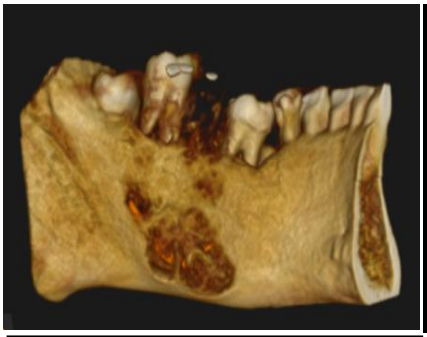

Figure- 9 3D Reconstructed view of lingual aspect of left posterior mandibular region.

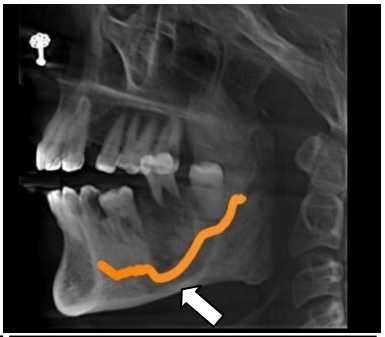

Figure- 10 Left lateral view of mandible on CBCT scan revealed downward displacement of mandibular canal and thining of inferior border of mandible (white arrow)

On the basis of clinical and imageological findings the probable diagnosis was made as cemento- ossofying fibroma. To confirm the diagnosis incisional biopsy was performed and which revealed cemento-ossifying fibroma.

C] Management:

After diagnosis of cemento-ossifying fibroma the patient was advised surgical excision of the lesion. Surgical removal of the lesion was performed (figure: 11) under general anesthesia. In addition, extraction of the mobile teeth, roots and curettage of the underlying bone was performed as well.

The resected specimen (figure: 12) was sent for histopathologic evaluation. Histopathologic examination revealed the underlying connective tissue was hypercellular comprising of plum proliferating fibroblasts, intermingled throughout the delicate fibrocellular stroma with interspersed within are interconnecting trabeculae of bone, osteoid and globules of calcified material resembling acellular cementum. Moderate degree of vascularity and mild chronic inflammatory cells noted (figure: 13).

Figure: 11 Intraoral postoperative view

Figure: 12 Resected Specimen with extracted teeth

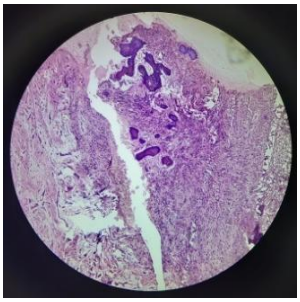

Figure: 13 Histopathological picture

On the basis of clinical, imageological and histopathological findings the present case was diagnosed as cemento- ossofying fibroma.

III. Discussion

Fibro-osseous lesions are challenging for oral and maxillofacial radiologists due to their similar pathology and require clinical and radiological correlation.

Cone beam computed tomography can assist in the accurate diagnosis and in the preoperative evaluation of associated lesions and conditions of the jaws with the help of a 3 dimensional image viewing, analyze the size, extent, and location of a tumor or cyst its penetration into surrounding structure and relation to vital structures such as nerves and blood vessels. It also reduce the risk of intraoperative and postoperative complications and guides surgical removal of lesion. Therefore, CBCT is valuable tool in order to improve the diagnosis as well as surgical removal of the lesion.

In 1872, Menzel reported the first description of variant of ossifying fibroma and gave the term "cemento-ossifying fibroma" in a 35 year old female patient involving large tumor of mandible. [4] It was later described by Montegomery in 1927. [3] In 1971 World Health Organisation (WHO) classified cemento-ossifying fibroma under cementum forming lesions which also included fibrous dysplasia, ossifying fibroma, and cementifying fibroma then by WHO in 2005 the term was reduced to ossifying fibroma. [3]

Clinically it present as a slow growing benign lesion of the jaw most often seen between the third and fourth decades of life. [3] Cement-ossifying fibroma occur more frequently in women than in men and the predilection for the commonest site is in the mandibular premolar-molar region. [5] In our case shows the lesion in the posterior molar region of mandible with female predilection. The lesion has slow growing, asymptomatic, although the patient may present with a swelling resulting in asymmetry. [5] In our case, the patient presented with asymptomatic growth that persisted for long duration.

Most of cases reported in the literature with history of trauma various authors have considered that COF arise either by reactive or by developmental origin, from the periodontal membrane to produce tumors composed of cementum, lamellar bone, or fibrous tissue. [6] But our case did not reveal any history of trauma in left mandibular posterior region.

Radiographic presentation of COF may follow different patterns based on the amount of mineralized tissue. It appear as a well demarcated unilocular lesion, that might have different degrees of opacification inside. [5] Root resoption and displacement of teeth may be an evident [6] which also seen in our case, suggesting tumor was in active stage. Radiographic features for COF has been mentioned by various authors. In 1973 Waldron and Giansanti [6] had reported that in 26% of COF cases showed lytic lesions, 63% showed lytic with radiopaque foci, and 12% were diffused and homogenous appearances presents. Later, in 2003 Barberi et al [6] described

radiographic pattern of COF as 1) defined lesion without sclerotic rim [40%], 2) defined lesion with sclerotic rim [45%], and third lesion with ill-defined border [15%].[6] Our case follow the findings of Waldren et al.

Various lesion may show clinical and radiographic resemblance to COF. Radiographically depending on the deposition of amount of cementum or evidence of internal calcification, COF may shows resemblance with cemento-osseous dysplasia, fibrous dysplasia, odontogenic cysts and tumors like keratocystic odontogenic tumor, calcifying odontogenic cysts (Gorlin cysts), and calcifying epithelial odontogenic tumors (Pindborg tumors). [7]

Modern advances in imaging help the oral and maxillofacial radiologist to use the CBCT with appropriate field of view (FOV) and spatial resolution, therefore the internal mineralized structure of the pathologic lesion can be investigated with a low radiation dose as compared to conventional radiographs. Axial CBCT images clearly demonstrate the location and extension of lesion. The expansion, perforation of the cortical plates can be evaluated on CBCT even if they are slight and the lesion in relation to its surrounding bone structures which might not be possible on conventional radiographs. By using the CBCT, the state of the lesion relative to their location, extension, dimensions, buccal and lingual cortical plates and density of internal mineralized structure could be assessed, which might not be possible on the conventional radiographs. This report showed the well demarcated radiolucency with size of anteroposteriorly 27mm and buccolingually 20.6mm with thining of buccal and lingual cortex on axial CBCT sections. Buccolingual expansion with thining of inferior border of mandible and radiopacities seen within the cortex with downward displacement of mandibular canal on coronal and saggital CBCT sections. All these CBCT features are unable to find on conventional radiographs.

By using the CBCT, discrimination of COF from these lesions that exhibit similar internal calcification on conventional radiography, would be more accurate. For example in our case COF has more obvious concentric buccolingual expansion on multiplaner CBCT images. [8, 9] Radiologic differentiation of COF from cemento-osseous dysplasia and calcifying cystic odontogenic tumor on CBCT revealed, multifocal high density mass in cemento-osseous dysplasia appeared low density area in the centre and the findings of calcifying cystic odontogenic tumor in which calcification is observed at or near the cyst wall. [8, 9]

The diagnostic feature of COF is a centrifugal growth pattern, therefore lesion grow by expansion in all directions which produces a round tumor mass with well defined borders and a thin radiolucent line representing a fibrous capsule which easily distinguishable from healthy bone. [6] This was similar to our cases in which CBCT axial view showed expanded buccal and lingual cortical plates with thining and intact margins.

Provisional diagnosis of cemento-ossifying fibroma in our case was made on the basis of clinical and imageological findings. The differential diagnosis which are to be included fibrous dysplasia, cement-osseous dysplsia, calcifying epithelial odontogenic tumor, cementoblastoma.[4]

Histopathologically, COF reveals the bulk of the lesion is composed of hypercellular comprising of plum proliferating fibroblasts, intermingled throughout the delicate fibrocellular stroma with interconnecting trabeculae of bone, osteoid and globules of calcified material resembling acellular cementum. Moderate degree of vascularity and mild chronic inflammatory cells were present. [10]

The management of cemento-ossifying fibroma depends mainly on its clinical and radiographical presentation. The smaller lesion can be treated with enucleation whereas moderately large lesions with local excision/curettage and mono-block resection with bone reconstruction for larger sized cemento-ossifying fibromas. [6] Prognosis of cemento-ossifying fibroma is known to be fair. The recurrence rate after removal of the tumor is considered rare which varies between 0 and 30 %. [11]

IV. Conclusion

CBCT is an invaluable tool in the radiographic differential diagnosis of fibro-osseous lesions and it give precise information regarding interior of such lesions and changes in the cortical bone, surrounding anatomic structures and aids in surgical management. In this report by using CBCT, discrimination of COF from those lesions which exhibit similar internal calcification on conventional radiography, would be more accurate.

Declaration of Patient Consent:
Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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Nil.

Conflicts of interest:
The authors declare no conflict of interest.

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