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Radiologic-Pathologic Correlations

Clinicopathologic and radiologic correlation of ossifying fibroma and juvenile ossifying fibroma—an institutional study of 22 cases ☆

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ABSTRACT

To analyze the clinical, radiographic, and histopathologic features of ossifying fibroma (OF) and juvenile OF (JOF), an archival study of 17 cases of OF and 5 cases of JOF reported over a period of 4.5 years was undertaken to analyze the aforementioned features. Age incidence of OF varied from 8 to 53 years, and JOF was seen in a comparatively younger age of 8 to 28 years. Both tumors were almost equally distributed between men and women. Thirteen cases of OF were found to occur in posterior mandible, whereas JOF was predominant in the anterior maxilla. Radiographically, OF varied from completely radiolucent (n = 7), mixed (n = 5), to completely radiopaque (n = 5), whereas JOF was predominantly radiolucent. Microscopically, stroma in OF varied from fibrous to highly cellular with overlap between various types of calcification. Juvenile OF showed highly cellular stroma and 2 distinct patterns of mineralization-psammomatoid and trabecular with osteoid seams. The origin of OF and JOF seems to be distinct from each other with OF arising from periodontal ligament and JOF arising from precursor myxoid tissue of paranasal sinuses.

1. Introduction

The term *ossifying fibroma* (*OF*) has been used since 1927. The World Health Organization (WHO) in 1971 classified cementum containing lesions into fibrous dysplasia, OF, cementifying fibroma, and cemento OF. However, the term *cemento OF* was reduced to OF in 2005 in the new WHO classification [1].

Ossifying fibroma of the jaws are well-circumscribed generally slow-growing lesions that enlarge in an expansile manner [2]. The tumor is defined as a demarcated and occasionally encapsulated lesion consisting of fibrous tissue containing variable amounts of mineralized material resembling bone and/or cementum [3]. These are most commonly seen in the third and fourth decades of life. They are largely restricted to tooth-bearing areas of the jaws, although posterior mandibular lesions may extend upwards into the ascending ramus for some distance. Of these lesions, 70% to 80% occur in the mandible, most often in the premolar-molar region with a definite female predilection [3].

Juvenile OF (JOF) is a large asymptomatic tumor of aggressive appearance because of the bone destruction it produces. The lesion is not encapsulated, although it is well demarcated from the surrounding bone [4]. The 2 variants of JOF, namely, psammomatoid JOF (PsJOF) and trabecular JOF (TrJOF), differ entirely in their clinical and histopathologic presentation. The average age of occurrence of TrJOF is considerably younger than PsJOF with average being 8 1/2 to 12 years as compared with 16- to 33-year range in case of PsJOF. Distribution is biased toward men. With respect to site, PsJOF occurs overwhelmingly in the sinonasal and orbital bones of the skull, whereas TrJOF is predominantly a gnathic lesion affecting jaws with a predilection for the maxilla [5].

The present study was undertaken to analyze the clinical, radiographic, and histopathologic features of the reported cases of OF and JOF. An attempt was also made to elucidate the pathogenesis of these lesions by correlating the clinicopathologic features.

2. Materials and method

Cases that were histopathologically diagnosed as OF and JOF were retrieved from the archives of Department Of Oral Pathology, Maulana Azad Institute of Dental Sciences, India, from January 2007 to June 2011. Clinical and radiographic findings were available for all cases. Careful investigation was carried out to avoid inclusion of lesions such as fibrous dysplasia, focal and florid cemento osseous dysplasias, syndrome-associated lesions, and multifocal lesions in the series. Special emphasis was taken for choosing cases of JOF as per the following criteria [6]:

a) the lesion showed a morphology consistent with the WHO definition of JOF, having a fibroblastic stroma containing strands of cellular osteoid; or

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b) the lesion demonstrated psammoma-like ossicles embedded in a spindle cell stroma [7].

Accordingly, 22 cases were selected, which included 17cases of OF and 5 cases of JOF. All the cases selected were analyzed with respect to age, sex, site of occurrence, radiographic presentation, and histopathology. Histologic sections of the excisional tissue were studied by 4 pathologists, and the lesions were analyzed with respect to the following features:

1) nature of supporting stromal tissue:
   a) highly cellular;
   b) cellular; or
   c) fibrous
2) nature of bony trabeculae:
   a) mature bone;
   b) immature bone; or
   c) osteoid seams
3) nature of calcification:
   a) cementicles;
   b) ossicles; or
   c) psammoma bodies
4) secondary changes:
   a) association with other lesions, for example, aneurysmal bone cyst (ABC);
   b) presence of myxoid change/hemorrhage/necrosis/inflammation.

3. Results

Clinical data analyzed revealed that the age incidence for OF varied from 8 to 53 years with a peak occurrence in third decade of life, followed closely by second decade. Juvenile OF was seen in a comparatively younger age group ranging from 8 to 28 years, with the trabecular variant presenting during the first decade. Three cases of PsJOF and 2 of TrJOF were identified in the present series.

The OF and JOF were almost equally distributed in men and women with a ratio of 8:9 and 2:3, respectively. The lesions were found to vary in size, with the smallest lesion measuring 2.5 × 1.2 cm (Fig. 1A) to a maximum of 10.5 × 2.5 cm (Fig. 1B).

Most cases of OF (n = 13) were found to occur in the posterior mandible, whereas JOF was predominantly observed in the anterior maxillary segment (n = 3) with extension into the maxillary antrum.

Radiographically, OF showed variable appearance ranging from completely radiolucent (n = 7), mixed (n = 5), to completely radiopaque (n = 5) appearance. Many tumors showed well-defined sclerotic borders (n = 8), whereas others showed diffuse margins. A case of OF associated with ABC formation showed characteristic ballooning expansion of the cortex. Of the 5 cases of JOF studied, 4 were completely radiolucent with ill-defined margins. One case of TrJOF showed radiopacity with well-defined sclerotic margins (Fig. 1).

Table 1 summarizes the clinical and radiographic features.

An incisional biopsy was performed for all cases, and concordance between the incisional and excisional biopsy diagnosis was seen in 20 of 22 cases. Two cases previously diagnosed as fibrous dysplasia eventually proved to be OF and TrJOF, respectively, on examination of excisional tissue.

Histologically, supporting stromal tissue was fibrous in 8 cases of OF, although focal areas of cellularity were noted particularly around areas of ossification. Five cases had highly cellular (Fig. 2A) and 4 cases had moderately cellular supporting stromal background. All cases of JOF analyzed showed a highly cellular supporting cellular framework. The stromal cells were plump and tightly packed with large vesicular nuclei and hardly discernible cytoplasm.

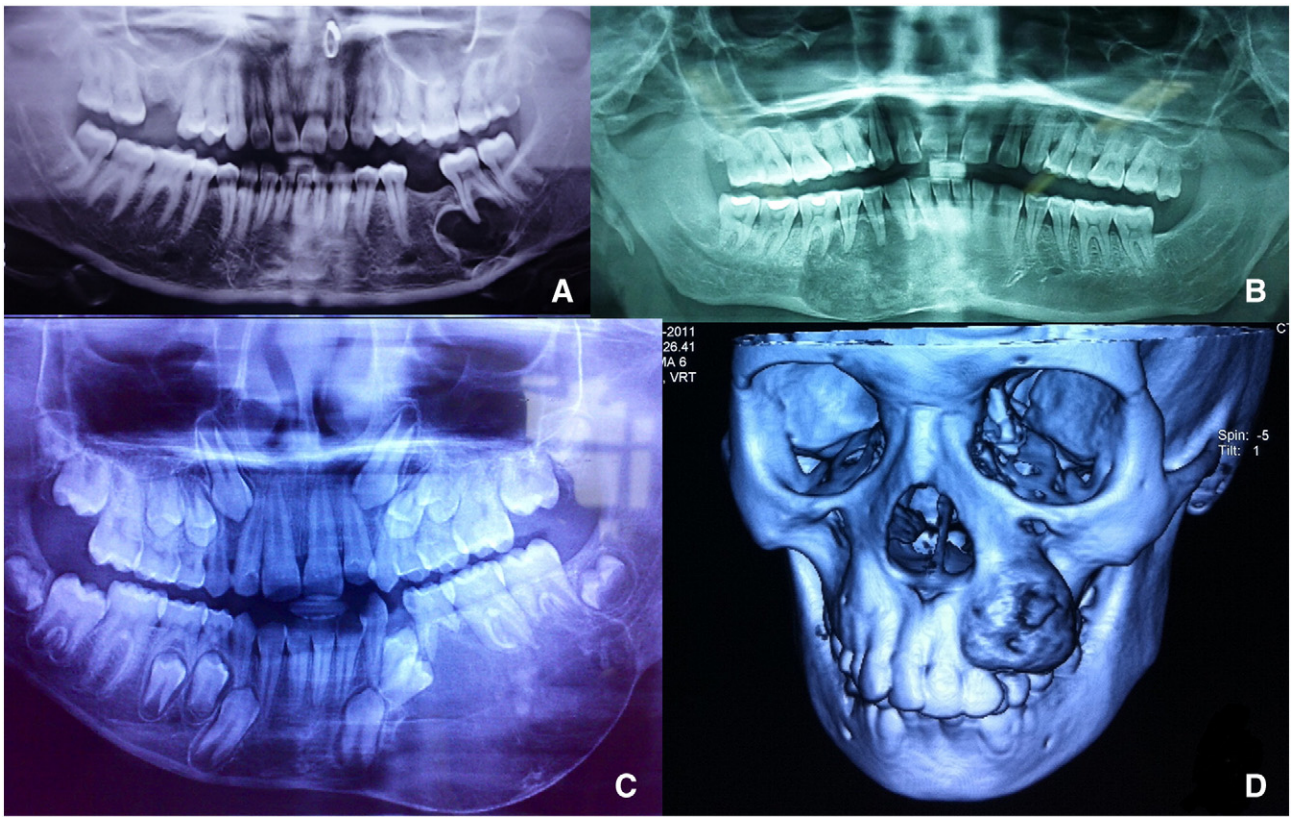

Fig. 1. (A) Panoramic radiograph showing OF presenting as a well-defined corticated radiolucent lesion (case no. 19). (B) Ossifying fibroma involving mandible appearing as a mixed radiolucent radiopaque lesion with ill-defined margins (case no. 18). (C) Ossifying fibroma associated with ABC showing characteristic ballooning enlargement of inferior border of mandible (case no. 21). (D) Three-dimensional reconstruction showing lesional extent of JOF in anterior maxilla (case no. 22).