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Review Article

Demographic Corelation of Fibro-osseous Lesions Prevailing in Uttar Pradesh - A Review

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Abstract

Fibro-osseous (FO) lesions are a group of lesions in which normal bone is replaced initially by fibrous connective tissue, and over a period of time, the lesion is infiltrated by osteoid and cementoid tissue. The concept of FO lesions has evolved over the last several decades and now including entities such as fibrous dysplasia, ossifying fibroma, juvenile ossifying fibroma, desmoplastic fibroma, osteoid osteoma, cemento-osseous dysplasia (COD), focal COD, and cement-ossifying fibroma. This article is thereby made to review the various FO lesions and their variance among the different groups prevailing in Uttar Pradesh. Besides, the fact there are various groups in these lesions, group of ossifying fibroma is found to be at a higher incidence rate.

Key words: Fibro-osseous lesions, Cement-osseous dysplasia, Focal cemento-osseous dysplasia

INTRODUCTION

Fibro-osseous (FO) lesions are a group of disorders that are characterized by replacement of normal bone by fibrous tissue that contains a newly formed mineralized product. FO lesions encompass a wide range of processes that may vary from bony to fibrous or inflammatory to neoplastic in nature. They can affect any part of the body and can vary from the innocuous to the extremely debilitating and potentially life threatening.

Demographic data on FO lesions over the years show that the general data regarding the epidemiology of FO lesions, the site of FO lesions varies but has been estimated that these lesions occur more in the mandible than in maxilla; however, in children, it is frequently seen in the maxilla. It is seen that there is a huge gender-wise differences. Higher male predominance is seen to occur in FO lesions while in children, there is no sex predilection. In general, FO lesions occur at any age-group. As such, there is no age preponderance. However, in adults, these lesions occur between 3rd and 4th decade of life whereas in children it is seen to occur more within 2nd decade of life. According to Muwazi and Kamulegeya,[1] among these group of lesions, fibrous dysplasia (56.1%) is one of the most prevalent followed by ossifying fibroma (32.9%) and osseous dysplasia (10.9%). This group of lesions is more prevalent in the mandible than in the maxillary region in higher age-groups. However, a marked predilection was also noted in females in case of the children with a mean age of 11–14 years of age in the maxilla according to Yadavalli.[2] Clinical findings suggest that there is increasing pain and enlarging soft tissue mass with swelling in the hard tissue suggesting a malignant change. The lesion is generally asymptomatic until the growth becomes prominent with a mild deformation in either of the jaws; displacement of teeth with varying degree of mobility. Furthermore, there are both buccal and palatal expansions of the cortical bone with overlying mucosa intact. Radiographically, in the early stages FO lesions appear as a radiolucent area, but as the lesion progresses, this radiolucency exhibit some calcifications which interpret as radio-opacities at certain areas. Displacement of teeth becomes more evident with the progression of the lesion.

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Over the years, there have been numerous attempts at classifying FO lesions. Among the earliest of them is the one proposed by Charles Waldron. This classification system segregates FO lesions into fibrous dysplasia, FO lesions (cemental origin), and FO lesions of unknown origin. The benefits of this classification are that it clearly briefs out the lesions out of its origin while its shortcomings are the lack of subjective headings of each lesion. In addition to Waldron's classification, there have been other classifications proposed by Malek *et al.*, Slootweg and Muller *et al.*, Eversole, etc., the WHO classified FO lesions into osteogenic neoplasms, non-neoplastic bone lesions, cherubism, central giant cell granuloma, aneurysmal bone cyst, and solitary bone cyst. The one uniform thread which can be noted in all these systems is that FO lesions encompass a wide range of diseases, from developmental and reactive to neoplastic. It is, therefore, of utmost importance that these disorders are diagnosed accurately so that appropriate treatment can be initiated.

With the multitude of lesions and presentations possible in case of these disorders, it is no surprise that comprehensive reviews of the same are few and far between. This is especially true in the case of our study population, where no or very limited epidemiologic data are available in this regard. Hence, the present study charts the demographic and clinic pathologic characteristics of FO lesions reported at our institution over a period of 7 years.

MATERIALS AND METHODS

A cross-sectional analysis was designed over a period of 14 years from January 2002 to December 2016. The data were collected from patient records, and histologically diagnosed cases of FO lesions were taken from the archives of Oral Pathology and Microbiology, Kothiwal Dental College, Moradabad, Uttar Pradesh, India. A total of 25 histologically confirmed cases of FO lesions were included in the study. Sociodemographic variables, clinical features, and radiographic findings were obtained from the patient's records. Hematoxylin and Eosin stained slides and blocks were retrieved from the archives and re-analyzed for all cases. Poorly documented cases or patients lost to follow-up were excluded from the study. The data obtained were tabulated, and relevant comparisons were drawn and analyzed.

RESULTS

Incidence Rate

FO lesions that have been detected so far, we have investigated 3 cases was of fibrous dysplasia (i.e., 12%), 5 cases were of ossifying fibroma (i.e., 20%), 3 cases were of juvenile ossifying fibroma (i.e., 12%), 1 case detected with desmoplastic fibroma (i.e., 4%), 1 case found with osteoid osteoma (i.e., 4%), 2 cases was of cemento-osseous dysplasia (COD) (i.e., 8%), 1 case of focal COD (i.e., 4%), and 2 cases of cemento-ossifying fibroma (i.e., 8%). These values have been depicted in the following Graph 1:

Age and Gender

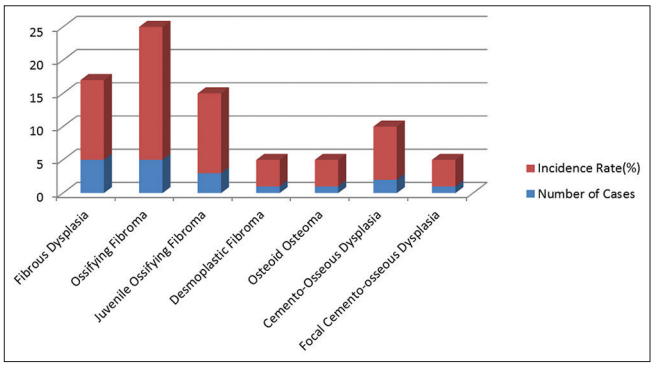
Out of all the 25 biopsy cases ($n = 25$), 14 cases were found in males (i.e., 56%) and 11 cases in females (44%) with a ratio of 3:1. From the above-mentioned cases: In case of:

i. Fibrous dysplasia: The mean age lies between 17 and 30 years of age out of which 40% is found in females and 60% in males.
ii. Ossifying fibroma: The mean age is 35 years where there is an equal incidence in both females and males (20%).
iii. Juvenile ossifying fibroma: The mean age is 19 years and found only in females (33.33%).
iv. Desmoplastic fibroma: The mean age is 52 years and found in females (100%).
v. Osteoid Osteoma: The mean age is 21 years and found in females (25%).
vi. COD: The mean age is 32–45 years of age out of which 66% is found in males and 33% in females.
vii. Focal COD: The mean age is 40 years and is found in males (100%).
viii. Cemento-ossifying fibroma: The mean age is 35 years with equal sex predilection (i.e., 20% in both females and males).

The following Table 1 is enumerated with Age and Gender distribution:

Site

Out of overall biopsied cases, 84% of cases are seen mandible, and 16% are seen in maxillae. The following cases with a variety of FO lesions are enlisted as: (a) Fibrous dysplasia occurs in the posterior part of mandible, (b) ossifying fibroma occurs in the ramus of mandible while medio-laterally, the lesion extended from the lateral part



Graph 1: Depicts the incidence rate of various fibro-osseous lesions

Table 1: Age and gender distribution

Lesion	Age (years)	Gender	In percentage
Fibrous dysplasia	17–30	Female+Male	40 and 60
Ossifying fibroma	35	Female	20
Juvenile ossifying fibroma	19	Female	33.33
Desmoplastic fibroma	52	Female	52
Osteoid osteoma	21	Female	21
COD	32–45	Male+Female	66 and 33
Focal COD	40	Male	100
Cemento-ossifying fibroma	35	Female+Male	20

COD: Cemento-osseous dysplasia

of the nasal cavity up to the maxillary buttress covering the maxillary sinus, (c) focal COD occurs in the lingual surface of the anterior portion of the mandible, (d) osteoid osteoma is seen to occur in the lower border of mandible, (e) juvenile ossifying fibroma extends from midline to 2 cm ahead to the angle of the mandible, (f) and desmoplastic fibroma occurs posteriorly at the ramusangle region.

Clinical Presentation

Among all the above-mentioned cases, (a) fibrous dysplasia clinically presents as intraoral swelling present in the right side of the mandible which is approximately 2 cm × 3 cm in diameter. There is an expansion of buccal and lingual cortical plates. Mandibular obliteration is seen with the displacement of premolars and molars. (b) Cemento-ossifying fibroma presents as a bony hard swelling in 43–45 region which is non-tender and fixed to underlying structures. Furthermore, there was seen buccal and lingual cortical plates expansion (c) COD presents with an oro-antral fistula developed along with pus discharge where there is buccal and lingual cortical plates expansion. Moreover, palatal expansion can also be seen up to the midline. (d) Focal COD presents with hard swelling in both the arches (i.e., maxilla and mandible), (e) osteoid osteoma occurs gradually with swelling of 3 cm × 2 cm in dimension along with buccal and lingual cortical plates expansion, (f) juvenile ossifying fibroma exhibits extra-oral swelling in the right lower jaw since 2 years lesion extended from midline to 2 cm ahead of angle of the mandible and (g) desmoplastic fibroma exhibits firm to hard intraoral swelling involving buccal and lingual cortex which measures 3 cm × 2 cm in diameter extending from 35 to 37 region.

Radiographic Presentation

The radiographic presentation of FO lesions helps us to differentiate among each lesions.

(a) In fibrous dysplasia, both the maxillary and mandibular cases interpret radio-opaque and radiolucent areas with the displacement of teeth which gives rise to ground-glass appearance, (b) in 1 case of ossifying fibroma, mixed radio-opaque, and radiolucent areas are seen w.r.t 43–45 region, (c) in the case of desmoplastic fibroma, features like well-delineated areas of unilocular radiolucencies can be seen, and (d) another case of juvenile ossifying fibroma, the affected lesion presents as radio-opacity with multiple root resorption and thinning of the cortical plates w.r.t 35–37 region.

DISCUSSION

Knowing the epidemiological data and incidence rate of FO lesions, these group of lesions varies from one another. Each of these lesions has a unique entity to some extent, but most of them were found to arise from the similar location. According to this present study, the age limit of fibrous dysplasia is between 17 and 30 years. This study is in accordance to studies performed by Weerakkody *et al.* which stated that the highest incidence of fibrous dysplasia was found before the age of 30 years. Similar studies by Shreedhar and Kamboj mentioned in a case report fibrous dysplasia of the palate where they have mentioned that the craniofacial form of fibrous dysplasia occurs 10–14 years of age.[3] In this study, the highest incidence rate of COD is 32–45 years and according to a study by More and Shirolkar the maximum age limit is 4th decade.[4] The mean age of occurrence in juvenile ossifying fibroma in this present study is 19 years. Similar results are in accordance with a study by Kumar and Paul titled psammomatoid variant of juvenile ossifying fibroma involving mandible where the mean age of occurrence is 17.7 years.[5] The maximum age limit of cement-ossifying fibroma is 35 years, and these results are similar to studies by Tapas and Soni[6] Osteoid osteoma has a mean age of occurrence in jaw bones (mandible) is 21 years, and these results are in accordance to study by Karandikar *et al.* where the age limit of osteoid osteoma falls within a 2nd decade.[7]

According to the studies by Bhattacharya and Mishra *et al.*, both fibrous dysplasia and CODs have almost the same prevalence in both males and females. The data from our study also show that there is no particular gender predilection in the case of these two entities. Both the lesions such as ossifying fibroma and cemento-ossifying fibroma have the highest female predilection, and these results are in accordance to studies by Tapas and Soni mentioned in a clinicopathological case report. According to studies reported by Singh and Solomon,[8] osteoid osteoma occurs more in females than males which was published in a case report. These observations are similar to our study. Desmoplastic fibroma occurs in females, and these results are similar to Hovinga and Ingenhoes in a review article.[9]

However, in this present study, FO lesions had a similar location (i.e., mandible) and these results are in accordance to various authors such as Alves and Oliveira *et al.* in a proposed case report of monostotic fibrous dysplasia in jaws.

In one of the case report presented as recurrent monostotic fibrous dysplasia of mandible, fibrous dysplasia occurs as swelling over the right hemi mandibular region and malocclusion of the teeth, pain, distortion of facial contour, and alveolar abscess associated with displacement of teeth, similar results were observed in our present study where there was intraoral swelling present in the right side of the mandible. In this study, cemento-ossifying fibroma presents as a bony hard swelling in 43–45 region which is non-tender and fixed to underlying structures. Furthermore, there was seen buccal and lingual cortical plates expansion which is similar to a study by Naik and Sujata[10] mentioned in a case report of Giant cemento-ossifying fibroma of the mandible and its features are alike to this study and are justified. COD in our present study illustrates mild buccal and palatal cortical plate expansion and this very much similar to study by Yildirim *et al.* Yadav in their study illustrates that juvenile ossifying fibroma as an extraoral diffuse swelling was present on the right lower side of face, approximately 10 cm × 6 cm in size, extending anteroposteriorly 2 cm away from the midline on the left side until right angle of mandible and superoinferiorly from a line connecting angle of mouth to angle of the mandible until 2.5 cm below the lower border of mandible. Moreover, these results are in accordance to our present study. Another case report by Anand *et al.*[11] where desmoplastic fibroma of mandible instantiated as cortex is perforated at some areas with associated soft tissue mass, and these results are similar to our present study where desmoplastic fibroma showed perforation of the buccal and lingual cortex with intra-oral swelling.

In a series of cases by Nitya *et al.* 19 cases showed a mixed radiolucent-radiopaque appearance, of which 4 cases showed a non-discernible pattern, and these results are similar to these present study in cases of fibrous dysplasia.

In case of ossifying fibroma, radiographically it can present with different patterns depending on the degree of mineralization, ranging from an immature, radiolucent and cyst-like lesion with scattered radiopaque foci to mature dense sclerotic lesions. The borders are well-defined, and usually, a thin radiolucent line representing a fibrous capsule separates the lesion from the surrounding bone as stated by Kumaraswamy *et al.* in one of his case report. These results are similar to this present study. Another case report by authors Sumer and Sumer radiographically,[12] a radiolucent destruction area was observed between the mandibular left lateral incisor and canine teeth in panoramic and periapical radiographs in case of desmoplastic fibroma, and these findings were very much similar to our present reviews where unilocular radiolucency was observed. However, up till now cases regarded so far in the literature mixed radio-opaque and radiolucencies could be observed in juvenile ossifying fibroma while in this study, juvenile ossifying fibroma presents with only radio-opacities radiographically.

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