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CLINICOPATHOLOGICAL COMPARISON OF FIBROUS DYSPLASIA AND OSSIFYING FIBROMA

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Abstract

Fibrous dysplasia and Ossifying fibroma of jawbones share the conduct of similar clinicopathological characteristics and this can be a challenge for the histopathologists. The purpose of this study was to evaluate the differences in clinicohistopathological features in fibrous dysplasia cells compared with ossifying fibroma of jaws bones. The study included 30 formalin-fixed, paraffin embedded tissue blocks; of which fifteen for patients with fibrous dysplasia and fifteen sample of ossifying fibroma of jaws. The histopathological examination was conducted on 4µm thick of H & E tissue sections. Results: showed where most cases were females; 11 cases (73.3%) for fibrous dysplasia, as well as ossifying fibroma. Most of FD cases presented in the maxilla (66.76%) while for OF most ofthe cases presented in the mandible (73.33%). FD cases were more predominant in molar area (60%) whereas OF cases were more predominant in premolar & molar area(33.33%). Regarding the histopathological components, in all cases of FD (100%) the presence of bone trabecule with large osteocytes within the lacunae was found, while OF featured more irregular osteoid or cementoid masses(80%) compared to (33.3%) osteoid observed in FD. Remarkable, (80%) of the OF cases had osteoblastic rimming , while it is presented in only two cases (13.3%) of total FD sample. However further studies are required to investigated other features for differentiation. Although several clinicopathological features can separate FD from OF, it is still difficult to arrive at a definitive diagnosis by using a single diagnostic modality.

Introduction

Fibro-Osseous lesions [FOLs] are a group of lesions which affect the jaws and the craniofacial bones and are considered as very puzzling spot in diagnostic pathology. The term refers to a varied course in which the normal architecture of bone is replaced by fibrous tissue containing varying amount of foci of mineralization[1]. Fibrous Dysplasia (FD) is a disturbance of bone metabolism that is classified as a benign fibro-osseous lesion. The fibrous connective tissue The dysplasia may be unilateral or less commonly bilateral. In patients with monostotic FD the jaws being among the most commonly affected sites, the maxilla is involved more often than the mandible. While in patients with polyostotic disease, the most commonly involved bones are the craniofacial bones, ribs, and metaphysis or diaphysis of the containing abnormal bone replaces normal bone[2]. The disease may affect a single bone (monostotic) or multiple bones (polyostotic). Polyostotic FD is less common, occurring in only 25% to 30% of cases. A few of these cases (approximately 3%) may also be associated with skin pigmentation and endocrine abnormalities, a condition known as the McCune-Albright syndrome, the syndrome is much more common in females[3].

proximal femur or tibia. The lesions are often found on one side of the body[4-6].

The ossifying fibroma is a benign neoplasm characterized by the substitution of normal bone by fibrous tissue and varying amounts of newly formed bone or cementum-like material, or both. As a result of histological similarities, ossifying fibroma, fibrous

dysplasia, and cemento-osseous dysplasia are classified together as benign fibro-osseous lesions[7].

According to their pattern of mineralization, four overlapping clinic-pathological entities have been historically identified[3]: (1) ossifying fibroma of odontogenic origin (cemento-ossifying fibroma COF), (2) trabecular juvenile ossifying fibroma (TrJOF), (3) psammomatoid juvenile ossifying fibroma (PsJOF), and (4) extragnathic adult ossifying fibroma. Cemento /Ossifying Fibroma (COF) is considered a benign osseous tumor،very closely related to FD, however forming its own entity according to the1992 classification of the WHO[8]. In the past, many investigators separately classified cementifying fibromas from ossifying fibromas.When curvilinear trabeculae or spheroidal calcifications were encountered, the lesion was often referred to as cementifying fibroma. When bone was predominated, OF was assigned. Today, however, the term "cemento-ossifying fibroma" is widely used because both osseous and cemental tissues are seen commonly in a single lesion6. It appears that OF occur across a wide age range, with the greatest number of cases encountered during the third and fourth decades of life6. There is a definite female predilection has been reported as high as (5:1)[9]. With the mandible involved in (62% to 89%) of patients far more often than the maxilla. Infrequently, it may involve the jaws bilaterally or multiple quadrants[10].

This study aimed to compare the clinical and histopathological features of Fibrous dysplasia and ossifying fibroma of the jaw bones.

Materials and Methods

The study samples included thirty formalin-fixed, paraffin -embedded tissue blocks which have been diagnosed as follows: fifteen fibrous dysplasia of jaw bones dated from (1979 till 2013), fifteen central ossifying fibroma of jaw bones dated from (1986till 2013). The specimens were obtained from the archives of the department of Oral& Maxillofacial Pathology/ College of Dentistry/ University of Baghdad, the archives of ghazi al hariri hospital for specialized surgeries. The clinical information related to the cases obtained from surgical reports supplied with the specimens.

Four-micrometer-thick sections were cut from each paraffin tissue block and stained with hematoxylin and eosin for diagnostic confirmation.

Data was compiled into statistical software, statistical package of social sciences (SPSS version 21). All variables were compared using Chi- square test. P value of less than 0.05was considered statistically significant.

Results

This study consisted 30 cases diagnosed histopathologically as Fibrous dysplasia and Ossifying fibroma of jaw bones. Conventional histological examination confirmed 15cases of FD & 15 cases of OF of jaw bones. Female predominance was found in both FD & OF cases comprising eleven cases (73.33%) for each (Table I).

Table I: Gender distribution

	FD		OF	
	NO.	%	NO.	%
Male	4	26.67	4	26.67
Female	11	73.33	11	73.33
Total	15	100	15	100

Fibrous dysplasia and ossifying fibroma was distributed between maxillary and mandibular jaws as follows: Ten cases (66.67%) of FD were in maxilla & five cases(33.33%) were in the mandible, while for OF four cases(26.67%) in maxilla and eleven cases (73.33%) were in the mandible. According to Chi-square test, the results of this study showed statistically significant difference regarding FD &OF in relation to jaws distribution as demonstrated in table II.

Table II: Jaws distribution of the study sample

	FD		OF	
	No.	%	No.	%
Max.	10	66.67	4	26.67
Mand.	5	33.33	11	73.67
	Chi-square	P-value	Coefficient of Association	P- value
	4.821	0.028	0.498	0.026

Fibrous dysplasia cases were distributed among various jaw regions in descending manner beginning with nine cases (60%) in molar area, four cases(26.76%)in premolar area and one case(6.667%) for each premolar& molar area and anterior area. Whereas for OF five cases (33.33%) were in premolar& molar area،four cases (26.67%) were in premolar area and three cases (20%) for each molar and anterior area. According to Chi-square test the results of this study revealed significant difference regarding FD & OF in relation to site distribution, as shown in table III.

Table III: Site distribution of the study sample

	FD		OF	
	No.	%	No.	%
Molar	9	60	3	20
Premolar	4	26.67	4	26.67
Pre&molar	1	6.667	5	33.33
Anterior	1	6.667	3	20
Chi-square		P- value	Coefficient of Association	P-value
6.667		0.049	0.559	0.018

The histopathological features of the FD & OF samples are illustrated in (figures 1&2). Evaluating the histopathological components in both lesions demonstrated the presense of bone trabeculae with large osteocytes within the lacunae in all cases of FD(100%) while OF featured more irregular osteoid or cementoid masses (80%) compared to (33.3%) osteoid observed in FD. Other features found in the two lesions included thick curvilinear trabeculae which was found in 8 cases (53%) of FD and in only 3cases (20%) of OF. There were remarkable common features observed in both FD and OF including metaplastic woven bone in a fibrous stroma which was a constant feature in both lesions, high cellularity of OF cases in comparison with a relatively hypocellular stroma of FD. Other common features for FD and OF included separate bony trabeculae, hemorrhage eareas and variable amounts of lamellar bone. Remarkably, (80%) of the OF cases had osteoblastic rimming while it is presented in only 2(13.3%) of the total FD samples as shown in Table IV.

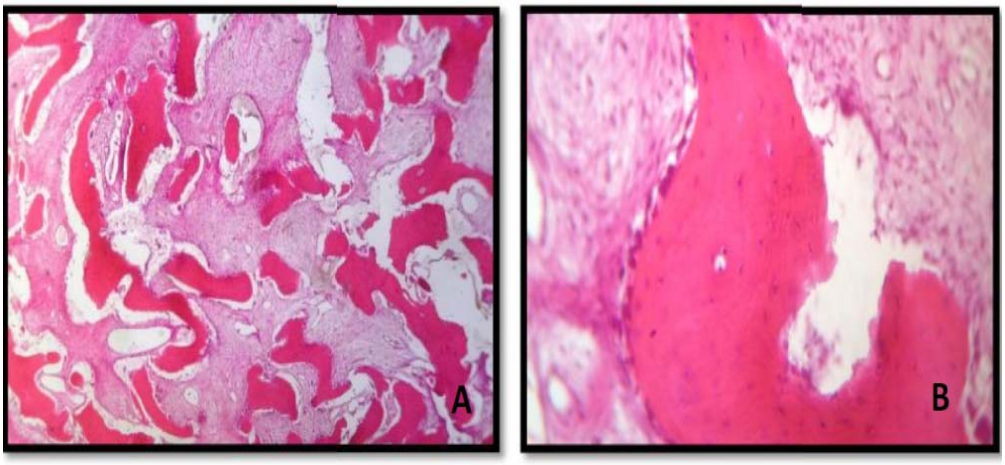

Figure 1: (A) H&E in FD (x200) (B). H&E in FD (x100)

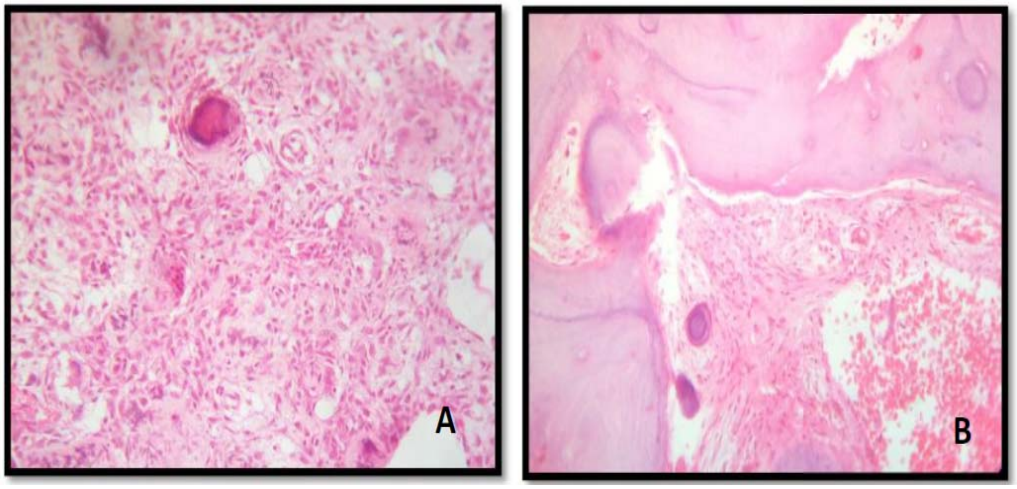

Figure 2: (A) H&E in OF (x200) (B). H&E in OF (x100)

Table IV: Histopathological components observed in FD and OF

Features	FD(No.15) N0. (%)	OF (No.15) N0. (%)	Chi-Square	P-Value	Sig
Calcified Component					
Thick curvilinear trabeculae	8(53%)	3(20%)	3.588	0.058	NS
Irregular mineralized masses	5(33.3%)	12(80%)	6.651	0.009	HS
Bone trabeculae with lacunae	15(100%)	11(73.3%)	4.615	0.03	S
Separated bone trabeculae	11(73.3%)	12(80%)	0.186	0.665	NS
Immature bone	15(100%)	15(100%)	-	-	-
Lamellar bone	3(20%)	2(13.3%)	0.321	0.570	NS
Osteoblast rimming	2(13.3%)	12(80%)	13.392	0.0002	HS
Non- Calcified components					
Free hemorrhage	1(6.66%)	4(26.6%)	2.16	0.14	NS
Peritrabecular clefts	15(100%)	7(46.6%)	10.9091	0.0009	HS

Discussion

In the present study, females comprised the majority of FD cases (73.33%),while the males were (26.67%), this finding is in agreement with Rosenbe et al.[11], Abdul et al.[12] & Abdel Tawab et al.[13], but it disagrees with Neville et al.[6]& Gnepp et al.[3]who all reported that males and females are affected with about equal frequency, however, Bhadada et al.[14] & Nityasri etal.[15] found a slight male predilection in FD samples Female predominance was found in OF cases as well (73.33%), similarly other studies[3,6&16-18] reported a definite female predilection . In contrast Krausen et al.[19] showed an equal percentage for males and females, and Alsharif et al.[20] showed a male predilection. Because FD and OF are uncommon lesions, with unspecific symptomatology and affect craniofacial bones, the diagnosis is generally late for its low suspicion. When FD or OF generally presents a symptomatic or slight symptoms course, with insidious growth, the discovery is usually incidental, that is why there is a special importance to point out that the diagnosis of such lesions is established upon contrasting data obtained for age &sex.

Considering jaw distribution, FD presented in the maxilla (66.67%) more than in the mandible (33.33%) ,This is in accordance with other investigators[3,12,21&22] who reported that the maxilla is a more common site of occurrence than the mandible and that more than(60%)of the cases occurring in the maxilla, whereas Sontakke et al.[23] showed an equal distribution in both maxilla& mandible. For OF most of cases presented in the mandible (73.33%), this is in agreement with other studies[17,18&24] .

In this study FD cases distributed in various regions in the jaws, most of them were in the molar area (60%),followed by premolar area (26.67%), premolar and molar area, and anterior area (6.66% for each). Almost similar percentages found by Nityasri et al.[15] regarding site distribution of FD of jawbones. Ossifying fibroma showed slightly higher occurrence in premolar–molar area (33.33%) followed by premolar area (26.67%) then molar and anterior area (20%) for each.These findings are in agreement with Liu etal.[18]. Whereas other investigators in this field showed slightly higher occurrence in the premolar area[8&19].

In the present study all of lesions have the woven bony trabeculae intermingled among a fibroblastic stroma displaying a homogeneous or moderate cellularity, this finding is in agreement with Gulati et al.[21] & Moshy et al.[25]. Other features found more in OF cases included irregular mineralized masses and osteoblastic rimming, while for FD cases the presence of thick curvilinear trabeculae interspersed into fibrous stroma and peritrabecular clefts were found more predominant than OF cases. These findings are in agreement with Moshy et al.[25] & Ribeiro et al.[26]. The present histopathological characteristic features has shown that although some histopathological features can separate FD from OF, it is still difficult to arrive at a definitive diagnosis by using a single diagnostic modality. Several diagnostic criteria have previously been proposed to diagnose and differentiate FD from OF, but none of these criteria alone have been shown to be sufficient for distinguishing these lesions.

Amidst the overlapping presentations of many FOLs, FD of the jaws is the hardest to differentiate from central OF in the same location. Although some criteria namely; presence of woven bone, peripheral osteoblastic rimming, and curvilinear pattern of bone have been laid down for the diagnosis of FD, but their diagnostic significance has been questioned. Most of these criteria have been adapted from the FD lesions affecting the long bones. However, the embryological difference in the origin of

the craniofacial bones has distinguished lesions in the craniofacial region from those occurring in other parts of the body. Need of the hour is to validate or renew the criteria for the differentiation of the FOLs of the jaw[27]. Hence, differentiation of these tumors on the basis of the above mentioned features is unreliable. Therefore, to have an accurate diagnosis, specific clinicopathological correlation is required[28] This is also critical because of their distinct pattern of progression and vastly different management protocols[6] . In this study we suggested to do the IHC expression of OC, in FD and OF, thus to find out if they are valuable in differentiating these two entities.

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