CASE REPORT

FIBROUS DYSPLASIA VS OSSIFYING FIBROMA: FAMILIARITY AND DISPARITY

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ABSTRACT:
Maxillofacial fibro-osseous lesions comprise a group of face and jaw disorders characterized by replacement of bone by a benign connective–tissue matrix with varying amounts of mineralized substances. Ossifying fibroma and fibrous dysplasia are the most common fibro-osseous lesions, which may be associated with significant cosmetic and functional disturbances. Ossifying fibroma and fibrous dysplasia are often agreed to have a diagnostic twist for the clinicians as well as the pathologists. Due to many similarities most of the conditions are diagnosed by the assist of all the clinical findings, radiology as well as histopathological findings. Here we present two case report one each of ossifying fibroma and fibrous dysplasia to help understand how to distinguish between them, based on clinical and histopathological findings.
Key words: fibro osseous lesions, fibrous dysplasia, ossifying fibroma

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INTRODUCTION

Maxillofacial fibro-osseous lesions comprise a group of face and jaw disorders characterized by replacement of bone by a benign connective–tissue matrix with varying amounts of mineralized substances. Ossifying fibroma and fibrous dysplasia are the most common fibro-osseous lesions, which may be associated with significant cosmetic and functional disturbances. As they show distinct patterns of disease progression, it is important to distinguish between the two; because of its risk for recurrence, ossifying fibroma needs to be completely enucleated from the surrounding bone.[1-3]

Fibrous dysplasia is a disease of bone maturation and remodelling in which the normal medullary bone and cortices are replaced by a disorganised fibrous woven bone. The resultant fibro-osseus bone is more elastic and structurally weaker than the original bone. Today it is understood that fibrous dysplasia results because of a defect in the gene and in its mutation or deletion that occurs; that encode for an intra cytoplasmic transducer protein required for bone maturation, where as in ossifynig fibroma also called as cemento-ossifying fibroma is a fibro-osseous lesion that arises from the periodontal membrane and mutation in HPRT2 gene.[4] The periodontal membrane is a layer of fibrous connective tissue surrounding the roots of the teeth. It contains multipotential cells that are capable of forming cementum, lamellar bone, and fibrous tissue.[3]

The most commonly divided group for fibrous dysplasia is into mono-ostotic fibrous dysplasia, poly-ostotic fibrous dysplasia: Jaffe-Lichtenstein type of fibrous dysplasia or McCune-Albright syndrome. If genetic defect occurs early in embryonic development, a large number of daughter cells will be affected, some of which may not yet have migrated to their eventual skeletal site. When such early term-altered cells migrate into several skeletal sites, they produce polyostotic fibrous dysplasia. If the genetic defect occurs in an even earlier phase of embryonic development, the original cell may produce daughter cells of divergent differentiation that is they will migrate into bone primordia, some into skin primordia, and some into endocrine gland primordia and hence produce the most popular McCune-Albright syndrome.

Monoostotic fibrous dysplasia develop in children and in teenage primarliy, with few if any cases beginning after the age of 25 years. Mono-ostotic fibrous dysplasia involves a single focus in one bone, accounting for about 75% of fibrous dysplasia cases. In the jaws, the favourite site for this condition has been the mandible followed by the premolar-molar region of the maxilla. Where as in the comparison, ossifying fibroma is seen most commonly in the females in the age group ranging from 30-40 years of life with the mandible far more often involved as compared to the maxilla.[5] These lesions of the jaws are comprised of a variety of specific pathological entities in which clinical, radiological and microscopic features often overlap, thereby confronting clinicians and pathologist with a difficult problem in diagnosis and subsequently the need of appropriate therapeutic measures. Keeping this in mind here we present two case report one each of fibrous dysplasia and ossifying fibroma highlighting their familiarities and disparities.

CASE REPORT 1

A 13 year old male reported with the complaint of swelling in the mandibular left posterior region of the jaw since 6 months, which gradually increased in size. On extraoral examination a uniform round swelling was present in mandibular left posterior region which was non tender. The size of the swelling was 2 cm x 2 cm and it was firm in consistency. The borders were distinct and regular and the skin covering it was healthy. Lymphadenopathy was absent. On intraoral examination, there was obliteration of vestibule seen extending from first left premolar region to distal surface of 1st left molar with no associated discharge, while the teeth showed flaring over the region. The overlying mucosa was pink with smooth texture and compressibility or depressibility was absent over it.

No relevant finding was observed on blood examination. On radiographic examination, an OPG was advised and the radiograph revealed a well defined unilocular radiolucency present between mandibular left premolar and molar region, with displacement of left second premolar towards molar region, with the result that mandibular second premolar was located at the usual position of mandibular first molar. The radiolucency was flecked with multiple small radiopacities. There was divergence of the roots of the premolars without any resorption. A computed tomography (CT) scan with coronal sections and 3D reconstruction of the lesion was done to know the extent of the lesion. The scan revealed an extensive mandibular tumor and a major periosteal reaction that may have been because of rupture of external cortical plate.

Based on the clinical and radiographic appearance, a provisional diagnosis of fibro osseous neoplasm (fibrous dysplasia and cemento ossifying fibroma) and calcifying epithelial odontogenic tumor and odontome was given.

Incisional biopsy was advised and histopathological examination, showed a fibrocellular connective tissue stroma with presence of mineralized components. These mineralized components were in the form of bony trabaculae and few basophilic stained cemental spherules. The bony trabaculae were regular in shape, eosinophilic stained, giving the appearance of lamellar bone and at places were lined by osteoblasts (Figure 1). Based on this and keeping the clinic-radiographic appearance into account a final diagnosis of ossifying fibroma was made.

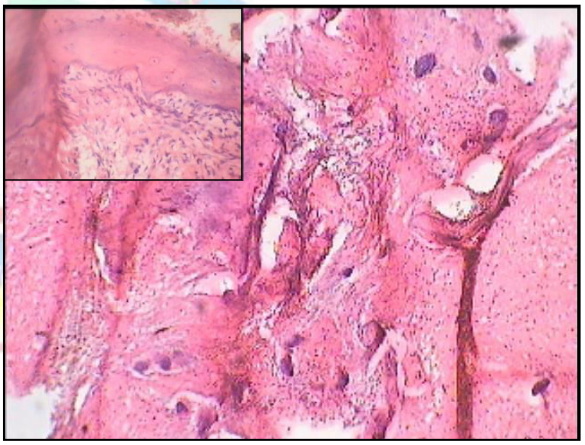

Figure 1: Bony trabaculae with cemental spherules. (H & E, X 10), Inset showing bony trabaculae with osteoblastic rimming (H & E, X 40).

CASE REPORT 2

A 25 year female reported with the chief complaint of swelling in the lower left and right posterior region of the jaw since 6 years. The swelling was asymptomatic. Her medical history was non contributory. Extra oral examination revealed a swelling in the right posterior region of the mandible extending from the commissure to the angle of the mandible and above the lower border of mandible measuring 3.0 cm x 3.0 cm in dimension. It was ill-defined, hard, and non tender, with overlying normal skin. Intraorally the

swelling extended from the mesial aspect of 44 to distal aspect of 47 with slight obliteration of the buccal vestibule. The overlying cortex showed slight expansion. On the left side extraoral examination revealed a diffuse swelling extending 2.0 cm lateral to the commissural region to 1.0 cm from the angle of the mandible and measured 2.0 cm x 2.0 cm in dimension, was hard and non tender with overlying normal skin. Submandibular lymph nodes were palpable on both sides, solitary, mobile, non tender. Intraorally, the swelling extended from mesial aspect of 34 to distal aspect of 36 with no obliteration of the buccal vestibule. The overlying mucosa was normal. No other relevant systemic findings were present.

OPG view was advised and it showed a well defined multilocular radiolucency with specks of radio-opacity in the right and left posterior mandible giving it a ground glass appearance. Radiolucency extended from 43 region to the angle of the mandible on right side and from 34 to 37 region on the left side of the mandible, with 46 missing on the right side. The lower border of the mandible was intact on both the sides. Occlusal radiograph showed expansion of the buccal and lingual cortices on both right and left side of the mandible. CT scan revealed well-defined lytic lesion with radiopacities involving right and left posterior mandible region with buccal and lingual cortical expansion. Hematological investigations were not relevant and based on clinical and radiographic appearance; differential diagnosis of fibrous dysplasia, ossifying fibroma, odontogenic tumor, giant cell tumor and paget's disease was reached at. Biopsy was done and specimens were sent for histopathological examination. The healing was uneventful.

Microscopic examination revealed numerous delicate trabaculae arranged in different forms lacking osteoblastic rimming. In some parts of the specimen of the left side osteoblastic rimming of the trabaculae along with mononuclear inflammatory infiltrate and numerous giant cells were seen. Intervening spaces showed mature fibrocellular proliferation. Typical Chinese letter pattern of the trabeculae was evident in few sections (Figure 2). Few marrow spaces with blood vessels were also present. Towards the periphery the bony trabeculae were merging with the normal surrounding bone. On the left side, numerous osteoclasts were also seen resorbing the normal bone. Based on this and keeping the clinic-radiographic appearance into account a final diagnosis of fibrous dysplasia was made.

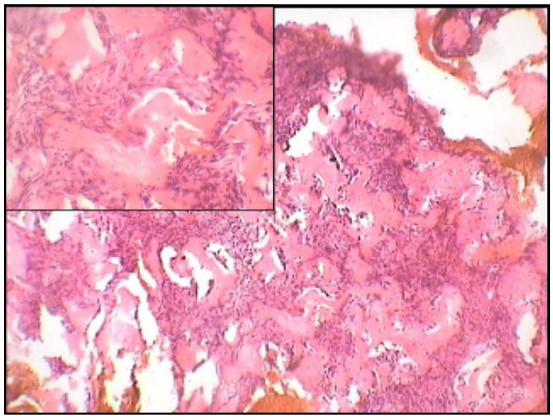

Figure 2: Bony trabaculae exhibiting Chinese letter appearance in a fibrocellular stroma (H & E, X 10). Inset showing bony trabaculae without osteoblastic rimming (H& E, X 40**).**

DISCUSSION

Ossifying fibroma and fibrous dysplasia are often agreed to have a diagnostic twist for the clinicians as well as the pathologist. Due to many similarities most of the conditions are however are diagnosed by the assist of all the clinical findings, radiology as well as histopathological correlation. Based on a study by Voytek et al ossifying fibroma was considered completely indistinguishable from fibrous dysplasia from their histological studies. These lesions also demonstrated considerable radiological overlap.[6]They also suggested that, because of this similarity, ossifying fibroma and fibrous dysplasia could be considered as a disease at either end of a single morphological spectrum. An additional report suggested that ossifying fibroma is a variant of fibrous dysplasia rather than a distinct disease entity [7]

Etiopathogenesis

Etiology of fibrous dysplasia is due to mutation in the GNAS1 (guanine nucleotide-binding protein, alpha-stimulating polypeptide 1) gene, while that of ossifying fibroma has two school of thoughts; some say it is odontogenic in origin, while the most recent study indicate that it is mainly occurs due to the mutation in the HRPT2 (A tumor suppressor) gene in patients with a rare condition known as hyperparathyroidism-jaw tumor syndrome, which is characterized by parathyroid adenoma or carcinoma, ossifying fibromas of the jaws, renal cysts and wiliam's tumor[8]. This discovery led to subsequent findings of HPRT2 gene mutation in two sporadic cases of ossifying fibroma of the jaws. The function of HPRT2 protein product (known as parafibromin) and the

mechanism by which mutation in this gene leads to tumor formation are not well understood.

Clinically

Fibrous dysplasia may manifest as a localized process involving only one bone, or as a condition involving multiple bones in conjugation with cutaneous and endocrine abnormalities. The clinical severity of the condition depends on the point in time during which the invariable mutation might have occurred. For ossifying fibroma small lesion may cause symptoms that are diagnosed only on taking a radiograph while large tumors may lead to cause painless expansion of the cortical bone and hence result in an obvious facial asymmetry. Pain and parasthesia may only be seen if any nerve is within the proximity of the tumor or the tumor is suppressing the nerve.

Radiological findings

Nearly all fibrous dysplasia show a diffuse, hazy trabacular pattern that has been called the ground glass appearance that are radiolucent in appearance. On radiograpy we see a homogenous, finely trabecular bone pattern replacing the medullary bone and both cortices and often the lamina dura as well. Its shape is fuiform and margin are indistinct, showing a gradual blend into the normal bone. In ossifying fibroma the radiological assesment shows a well defined, unilocular egg shaped radiolucency and some may even show a sclerotic border.[5] Depending on the amount of mineralizations produced, it may appear completely radiolucent. True ossifying fibroma that are largely radioopaque with only a thin radiolucent periphery are uncommon. Root divergence or resorption of the roots associated with the tumor might be seen well with large tumors that often show a characteristic downward bowing of the inferior cortex of the mandible. One key radiographic difference is that ossifying fibroma usually has an intracortical location as opposed to the more central distribution of fibrous dysplasia.[9]

Histological examination

Normal bone is replaced by a generally loose, cellular fibrous tissue composed of haphazardly arranged, variable shaped trabeculae of woven bone, which typically lacks osteoblastic rimming but often contains numerous osteocytes that may appear to arise directly from the fibrous stroma along with the presence of aggresive multinucleated giant cells in fibrous dysplasia where as in ossifying fibroma the tumor consist of cellular fibrous connective tissue that exhibits areas that are loose and other zones that are so cellular that the cytoplasm of the individual cell is hard to differentiate because of nuclear crowding. Mitotic figures may be found. Areas of hemorrhage and small cluster of multinucleated giant cells are seen. The mineralization component varies that may range from irregular strands of highly cellular osteoid encasing osteocyte to concentric lamelated and spherical ossicles that vary in shape and have basophilic centre.

Molecular characters

Fibrous dysplasia and ossifying fibroma are similar disease entities in that both show markers consistent with the osteogenic lineage in their stromal fibroblast-like cells. They are distinct, however, in the precise composition of bone matrix, as shown by osteocalcin immunohistochemistry. Finally, PCR analysis with PNA for GNAS mutations at the Arg201 codon is a potentially useful method to differentiate between the two.[10]

Treatment

Treatment of fibrous dysplasia is osseous contouring of the affected site, however most of the times children adapt well to the facial expansion and do not need surgery. If surgery is needed then it is ideal to defer it until adulthood (ages 18-21 years). In ossifying fibroma generally enucleation of the tumor is done with great ease followed by bone grafting if desired with a very less possible chance of recurrence.

CONCLUSION

At the tail's end it would be likely to say that both fibrous dysplasia and ossifying fibroma share many common features although some of the features that are seen on the histopathological survey along with the recent developing immunohistochemical methods including that a clinic-radio-pathological correlation may be needed in order to properly pin point to a particular disease entity.

REFERENCES

1 Waldron CA. Fibro-osseous lesions of the jaws. J Oral Maxillofac Surg 1993; 51: 828–835.
2 Brannon RB, Fowler CB. Benign fibro-osseous lesions: a review of current concepts. Adv Anat Pathol 2001; 8: 126–143.
3 Alawi F. Benign fibro-osseous diseases of the maxillofacial bones. A review and differential diagnosis. Am J Clin Pathol 2002; 118(Suppl): S50–S70.

4 Pimenta FJ, Silveira LFG, Tavares GC, Silva A, Castro WH, Gomez MV, Teh BT, Marco LD, Gomez RS. HRPT2 gene alterations in ossifying fibroma of the jaws. Science Direct 2006; 42: 735-739.
5 McCarthy EF, Frassica FJ. Pathology of bone and joint disorders 2nd ed Cambridge University Press 2015.
6 Voytek TM, Ro JY, Edeiken J, et al. Fibrous dysplasia and cemento-ossifying fibroma. A histologic spectrum. Am J Surg Pathol 1995;19:775–781.
7 Sissons HA, Steiner GC, Dorfman HD. Calcified spherules in fibro-osseous lesions of bone. Arch Pathol Lab Med 1993; 117: 284–290.
8 Neville BW, Damm DD, Allen CM, Bouquot JE. Oral and maxillofacial pathology.3rd ED Philidalphia, PA, USA, Noida, India: Saunders Elsevier; 2009.
9 Corrado T, Millesi W, Zerman N, Massimo R, Politi M. A case of aggressive ossifying fibroma with massive involvement of the mandible: Differential diagnosis and management options. Int J Ped Otorhinolaryng Extra 2006; 1:167-172.
10 Toyosawa S, Yuki1 M, Kishino1 M, Ogawa1 Y, Ueda T, Shumei MS, Eiichi Konishi E, Iida S, Kogo M, Komori T, Tomita Y. Ossifying fibroma vs fibrous dysplasia of the jaw: molecular and immunological characterization. Modern Pathology 2007; 20: 389–396.

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