Complex Odontoma an Incidental Finding : A Case Report

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Introduction

The term 'odontoma', by definition alone, refers to any tumor of odontogenic origin. Here enamel and dentin are usually laid down in an abnormal pattern because the organization of the odontogenic cells fail to reach a normal state in morpho-differentiation. As this lesion is composed of more than one type of tissues it is referred to as a composite odontoma. Here if the tissues are ordered in structure, bearing atleast a superficial anatomic similarity to a normal tooth they are referred to as compound composite odontomas. Whereas those calcified masses which show no morphologic resemblance to even rudimentary teeth are called as complex composite odontomas.[1]

Case Report

A 15 yr old female patient reported to the OPD for orthodontic treatment. On clinical examination deciduous maxillary canines on both left and right side were seen. On radiographic examination (OPG) bilateral impacted permanent canines were seen with an overlying radiopaque mass, that was preventing the eruption of the left canine (Fig 1).

The lesion was provisionally diagnosed as a "complex odontoma". Surgical excision and enucleation of the radiopaque mass was planned under local anesthesia along with extraction of the retained deciduous canines (Fig 2).

Upon complete removal of the mass the canines were visible and an orthodontic bracket was placed on each of the canines for orthodontic extrusion later.

The tissue specimen was sent for decalcification followed by routine histopathological examination. The haematoxylin and eosin (H&E) stained sections showed presence of dentin, pulp tissue and cementum which were arranged haphazardly. This picture confirmed the diagnosis of a complex odontoma (Fig 3 & 4).

Discussion

Broca first coined the term "Odontome" in 1866. He defined it as a tumor formed by an overgrowth of complete dental tissue.[2] In 1946 Thoma and Goldman included tumors composed of well differentiated tooth structure in the term "Odontome". In 1961 Gorlin and later in 1983 Shafer defined odontoma as a tumor that has developed and differentiated enough to produce enamel and dentin. Here the tooth like material is laid down in an abnormal pattern because of failure of the progenitor odontogenic cells to reach a full state of morpho-differentiation.[3]

In the second edition of the WHO Histologic Typing, Kramer IRH et al, classified odomomas under the broad category of tumors containing odontogenic epithelium with odontogenic ectome-senchyme with or without dental hard tissue formation. Here 3 types of odontomas are listed: Odontoblastoma, Complex and Compound Odontomas. Though WHO continues to classify these lesions as tumors most investigators consider them to represent developmental anomalies similar to hamartomas.[4]

Complex Odontomas are defined as a malformation where all the dental tissues are seen and are well formed but in a disorderly pattern. Compound Odontomas are a malformation where all the dental tissues are represented in a more systemic pattern and so the lesions resembles tooth like structures.

Most mixed odontogenic tumors are considered to be hamartomatous and are part of a developing complex Odontoma line. Ameloblasticfibroma and ameloblastic fibrodentinoma is the first step in the development of a complex odontoma. These tumors can develop further into the second stage called ameloblastic fibrodontoma. The final stage is the fully mineralized complex Odontoma. Philipsen H P, et al in 1997 stated that the compound Odontome is not an alternative final stage of the complex Odontome but it is a malformation and is closely related to the creation of supernumerary teeth esp. mesiodens. It is often difficult to differentiate clinically and histologically between supernumerary teeth and odontomas.[5]

Incidence

- Compound odontomas are more common than complex.[6-9, 10, 11]
- Majority odontomas occur in the 2nd decade of life[6, 9] .The age span ranges from 2 to 79yrs with the mean age being 19yrs.
- Common location for compound odontomas is the anterior maxilla and Complex odontomas are usually seen in the posterior mandible and then in the anterior maxilla.
- Can affect any gender.
- Rarely associated with primary dentition usually seen with permanent teeth.

Etiology

The exact origin is unknown and several theories including trauma and infections have been proposed. It was documented by Levy BA in 1968 and Lopez Areal in 1992 that after incidence of trauma odontoma production occurred. It was observed that the timing of the injury is important and that the earlier the injury occurs in life the more likely that an Odontome will develop[12, 13].

Hitchin in 1971 reported that odontomas are inherited or may develop as a result of genetic mutation. Other studies showed that there were increased levels of p-21 and this was said to be a product of v-Ha-ras gene. Sandros et al in 1991 reported that numerous human odontogenic tumors showed an overexpression of the ras proto oncogen product p-21 which is a 21-kDa phosphoprotein .Another study done by Gibson C W et al in 1992 showed that (100%) transgenic mice with mice with a double mutated albumin (albumin ras and albumin myc) developed tumor by 8-12 weeks of age. The reason was thought to be because of the effect of myc and ras 2 oncogenes[14, 15].

Amling et al in 2002 showed the

formation of odontomas in the region of the unerupted incisors in mice with the deletion of c-src gene.

In human also a large number of odontomas are seen in inheritable syndromes like Gardener's Syndrome [16].

Clinically Features

These are usually seen as hard painless masses and are small rarely exceeding the diameter of the associated impacted tooth. Most cases are discovered as an incidental finding. Radiographs are helpful in differentiating between complex and compound odontomas.[2]

Radiographic

The radiographic appearance of odontomas is practically always diagnostic feature. These lesions are radioopaque and may be surrounded by a radiolucent line. Compound odontomas contain a collection of tooth like structures of varying size and shape and ranging from as few as two or three to as many as 2000[17], whereas Complex odontomas appear like calcified masses and may be confused with osteomas.

Histological features

Dental tissue in the form of dentin, enamel, pulp tissue and cementum are seen in varying amounts in most cases. The connective tissue capsule surrounding the Odontome is similar to an enlarged dental follicle. The tissue shows abnormal arrangement, but normal histopathology. Spherical dystrophic calcifications, enamel collections and sheets of dysplastic cementum and dentin may be also observed. A few odontomas may show a mix of both compound and complex features as in a few miniature, well formed teeth along with a disorganized tooth structures mass. Immature odontomas may lack all but rudimentary calcification.

In compound odontomas, the tumors consist mostly of small single rooted teeth that are embedded in a fibrous connective tissue stroma. Usually fragments of enamel are seen but pulp is found in the normal location. Complex odontomas often consist of sheets of immature tubular dentin with encased hollow tooth like structures.[2]

Thoma and Goldman in 1946, reported the presence of ghost cells in complex odontomas. These cells are present in compound odontomas but in a lesser degree. These ghost cells act as the nidus for calcifications.[18]

Treatment and Prognosis

Conservative surgical approach is the treatment of choice and recurrence has not been reported. Though impacted permanent teeth have been extracted in relation to the removal of the lesion it is better to preserve these teeth and wait for their eruption.[2]

Conclusion

Bilaterally impacted permanent canines were incidentally discovered on an OPG taken for orthodontic treatment. A small radiopaque mass was seen occlusal to the left permanent canine and on surgical removal it was given provisionally as a complex composite odontoma. Histopathological examination confirmed the diagnosis.

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Fig 1: OPG of patient showing bilaterally impacted permanent maxillary canine. With retained deciduous canines (bilateral). Small calcified mass seen occlusal to left permanent canine.

Fig 2 : Gross specimen and extracted deciduous canine.

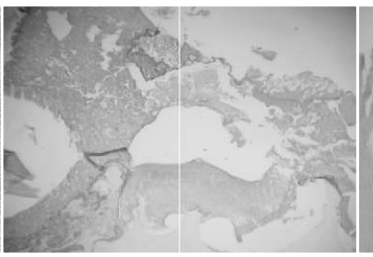

Fig 3: Photomicrograph showing haphazardly arranged dentin, pulpal tissue and cementum. (H&E, 40X)

Fig 4: Photomicrograph showing dentin and pulpal tissue. (H&E,100X)