Odontoma - A Retrospective Study from Nagpur, India

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ABSTRACT

Background: Odontoma represents tumor of odontogenic origin, which are considered to be hamartomatous rather than a true neoplasm. Aims and Objectives: To retrospectively evaluate the types, clinical features and treatment given for the management of odontomas. Materials and Methods: This study evaluated all cases of odontomas reported to the Department of Oral Pathology and Microbiology, Govt. Dental College and Hospital, Nagpur, India during 2012-2013. Data collected includes medical records with socio-demographic details, panoramic radiographs, and pathological reports and details of management. Results: The compound types were usually located in the anterior maxilla and the complex type in posterior mandible; most of them were correctly diagnosed clinically and radiographically prior to confirmation by histopathology reports of the specimens. Conclusion: Even though the exact etiology of odontomas is unknown, surgical enucleation and curettage was done with very less chance of recurrences.

Keywords: Complex Odontomas; Compound Odontomas; Odontoma

Introduction

Odontomas are the most common odontogenic tumors of epithelial and mesenchymal origin. The term 'odontoma' was coined by Paul Broca in 1867. Broca defined the term as tumors formed by overgrowth of complete dental tissue that give rise to ameloblasts and odontoblasts. The majority of odontomas are discovered during the second and third decades of life. They are usually asymptomatic, discovered on routine radiographs and are commonly seen in permanent dentition. This retrospective study was carried out in central part of India (Nagpur vidharbha region) to evaluate the types, clinical features and treatment given for the management of odontomas.

Materials and Methods

This study evaluated all odontomas reported to Govt. Dental College and Hospital, Nagpur during 2012-2013. A total of 200 cases of odontogenic tumors were retrieved from the files of department of Oral Pathology and Microbiology, Govt. Dental College and Hospital, Nagpur. Data collected includes medical records with socio-demographic details, panoramic radiographs, and pathological reports and details of management. The results were analyzed and compared with the similar studies in literature.

Results

A total number of 26 cases of odontomas accounting for 13.0% (26/200) of odontogenic tumors were included in this study. Out of 26 cases of odontomas, 57.69% (15/26) were complex odontomas and 42.30% (11/26) were compound odontomas.

Complex Odontoma: Considering the frequency out of 26 cases of odontomas, 15 cases of complex odontomas were present, accounting for 57.70% (15/26) of odontomas and 7.5% (15/200) of odontogenic tumors. In this review, the mean age of complex odontomas at the time of diagnosis was 30.8 years. Out of 15 cases of complex odontomas, eleven cases occurred before the age of 30 years while four cases occurred after the age of 30 years. Gender distribution was 12 males and three females reported, with male: female ratio of 4:1 (Graph 1). The majority of cases of complex odontomas were found in posterior mandible 86.7% (13/19) followed by posterior maxilla 13.3% (2/26). Clinical presentation of the complex odontome was usually a painless, slow growing and expanding lesion that is usually discovered on routine radiographs of the jaw bones but in this review, 53.33% (8/15) cases reported pain and swelling, 20% (3/15) had pain without swelling and 26.67% (4/15) with painless swelling. Impacted/ unerupted teeth were noticed with 33.33% (5/15). Pus discharge and sinus formation was seen in 13.33% (2/15) cases.

Radiological features were as follows. Out of 15 cases, radiographic picture of 11 cases were available. Radiographically, the lesion appears as a more or less amorphous radiopaque mass of calcified material. Tooth like radiopaque structures are usually not detectable. Resorption of neighboring teeth is rarely seen. Unerupted teeth were associated with complex odontomas in five cases. Histopathology reports shows that, microscopically, the lesion consists of a well-deliniated, roughly spherical mass of a haphazard conglomerate of mature hard dental tissues. Some shows better ordered, tooth like structures. Clear spaces and clefts that probably contain mature enamel lost in the process of decalcification are often seen. A thin fibrous capsule is usually seen surrounding the lesion. The given sections show haphazard conglomerate of enamel matrix, dentine, pulp tissue and cementum. Features are suggestive of complex odontomas.

Graph 1: Age and gender distribution
Compound odontoma: The frequency of the lesion was as follows. Out of 26 cases of odontomas, 11 cases were of compound odontomas, accounting for 42.30% (11/26) of odontomas and 5.5% (11/200) of odontogenic tumors. In this review, the mean age of compound odontomas at the time of diagnosis was 20.4 years. Out of 11 cases of compound odontomas, seven cases 63.6% (7/11) occurred in second decade of life, while first, third, fourth and sixth decade had one case each. Gender distribution shows that the male: female ratio of compound odontomas was almost equal (0.83:1) with five males and six females (Graph 1). The maxillary anterior region was the most frequent site for this lesion as compared to the complex odontomas, i.e., 54.5% (6/11) maxillary anterior region, 36.4% (4/11) posterior mandibular region and 9.1% (1/11) in mandibular anterior region. It is seen that the anterior maxilla holds a somewhat stronger tendency for being the predilection site for the compound odontomas as the posterior mandible does for the complex odontomas.

The compound odontome is usually a painless, non-aggressive lesion. In this review of 11 cases, six cases were reported with pain with or without swelling while one patient exhibited painless swelling. Three patients had come to the hospital for orthodontic treatment. Impacted/unerupted teeth were noticed in five cases. Radiographically, the compound odontomas appear as a radiopaque mass of calcified structures with an anatomical similarity to normal teeth, though the teeth are dwarfed and deformed. A narrow radiolucent zone in most cases usually surrounds the compound odontomas.

The main histopathological features separating the two types of odontomas is that the compound odontomas show a high degree of morphodifferentiation, resulting in a lesion consisting of many tooth-like structures (denticles) generally enclosed in a fibrous capsule. Each denticle is composed of enamel, dentin, cementum and pulp tissue arranged regularly on the whole, but showing many small divergences from the normal pattern. One additional feature is the presence of ghost cells in odontomas but in this review, no ghost cells were seen in any case. These sections show denticles composed of enamel, dentine and pulp tissue in a regular arrangement suggestive of compound odontome.

Discussion

Odontomas are better defined as hamartoma than a true neoplasm. As odontomas are composed of more than one type of tissue, they are considered to be mixed odontogenic tumors. The dental tissues in odontomas lack organization due to disordered expression and localization of the extracellular matrix molecules in the dental mesenchyme. The exact etiology of odontome is unknown. However, it has been suggested that trauma, infection, inheritance or a mutagen may lead to the development of such lesions. The etiology of odontome is that most result from extraneous odontogenic epithelial cells. When these buds are divided into several particles they may develop individually to become numerous, closely positioned malformed teeth or tooth-like structures. When the buds develop without such uncommon division and consists of haphazard conglomerates of dental tissues, they may develop into complex odontome. However, the transition from one type to another is commonly associated with varying degrees of morphodifferentiation or histodifferentiation or both, and it is often difficult to differentiate between both the types. Recently, Philipsen et al., put forth the hypothesis that a process of compound odontome is pathogenically related to the process producing hyperdontia, ‘Multiple Schizodontia’ or locally conditioned activity of dental lamina.

W.H.O classified odontomas into three groups, such as complex odontome, compound odontome and ameloblastic fibro-odontome. There are essentially two types of odontomas: complex composite odontome and compound composite odontome. A new type known as Hybrid odontome is also reported by some authors. Odontomas are painless, slow growing and expanding lesions, usually discovered on routine radiographs. The only difference between the complex and compound odontomas is that the latter resembles quite closely to a tooth while the former does not.

Complex odontoma: The relative frequency of complex odontomas among odontogenic tumors varies between 5% and 30% in different series. The frequency of complex odontomas among odontogenic tumors was 7.5%, in accordance with the survey conducted by Yong lu et al. The majority of cases occur before the age of 30 years with a peak in second decade of life. Based on the 139 cases of odontomas survey, the mean age at the time of diagnosis was 19.9 years, odontomas compared to 30.8 years reported in our study., i.e., nine cases occurred before the age of 30 years with peak in second and third decades. The male: female ratio varies between 0.8:1 to 1.5:1 in different surveys and in present study male: female ratio of 4:1 was found with male predilection. This large difference in age and sex distribution is due to the small number of sample size from where significant results are difficult to achieve. Majority of cases of complex odontomas are found in posterior mandible as seen in this series, in which 86.7% of cases were seen in posterior mandible. Unerupted teeth are associated with complex odontomas from 10% to 44.4% of the cases comparable to 33.3% of cases in the present series. Histologically, Odontoma contains normal appearing enamel or enamel matrix, dentin, pulp tissue and cementum which may or may not exhibit a normal relation to one another.

Compound odontoma: The relative frequency of compound odontomas among odontogenic tumors varies between 9% to 37% in different surveys, making this tumor as one of the most common odontogenic tumor. In his retrospective study, compound odontomas account for 5.5% of odontogenic tumors. Based on the data collected, majority of cases appear before the age of 20 years with a clear peak in second decade of life as seen in present survey where 63.6% of the cases reported in second decade of life. The male:female ratio varies between 1.2:1 to 1.1, comparable to 0.8:1 ratio in this study. It is seen that the anterior maxilla holds a somewhat stronger tendency for compound odontomas than the posterior
mandible that shows predilection for complex odontomas. Unerupted teeth are associated with compound odontomas more often than complex odontomas as seen in the present series i.e., 45.4% versus 33.3%. The main feature separating the two types of odontomas is that the compound odontomas show a high degree of morpho-differentiation, resulting in a lesion consisting of many tooth like structures enclosed in a fibrous capsule. It has been found that 16% of complex odontomas contain isolated areas of ghost cells but in present review, no case of complex or compound odontomas exhibited ghost cells. Association of complex odontomas with calcifying odontogenic cyst has been absent in the present study sample.

Conservative surgical enucleation is considered to be the treatment of choice in both complex and compound odontomas with little chances of recurrence. Enucleation and curettage was performed in all cases with good prognosis with one case of recurrence with complex odontomas. The possible explanation for this was incomplete removal done at the time of surgery, leaving behind the focus for future infection and pain in posterior mandible. Hence, a second surgery was done to treat the patient.

**Conclusion**

In conclusion, the exact etiology of odontomas is unknown surgical enucleation and curettage was done with very less chance of recurrences. This study increases our understanding of the prevalence and occurrence of this unique tumor, thereby enabling us to diagnose and treat it more effectively.

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