Unicystic Ameloblastoma: A Perception for the Cautious Interpretation of Radiographic and Histological Findings

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ABSTRACT
The term Unicystic Ameloblastoma (UA) refers to those cystic lesions that show clinical and radiological characteristics of an odontogenic cyst but on histological examination show a typical ameloblastomatous epithelium lining part of the cyst cavity, with or without luminal and/or mural tumor growth. Till date, lot of controversies exist among oral surgeons and oral pathologists regarding this entity. An attempt is being made here to discuss all the diagnostic dilemmas associated with UA.

Key Words: Ameloblastoma. Radiolucency. Unicystic ameloblastoma.

INTRODUCTION
Ameloblastoma is one of the most common benign odontogenic tumor accounting for approximately 1% of all tumors and 19% of all odontogenic tumors.1 Unicystic Ameloblastoma (UA) represents 5 - 15% of all reported cases.2 UA refers to unilocular intraosseous cysts lined by characteristic ameloblastic epithelium.3 It occurs in a younger population mainly in 2nd and 3rd decade as compared to conventional ameloblastoma which occurs over a wide age range.4 Most common site of occurrence is mandible associated with an impacted tooth, usually the 3rd molar. Radiographically, the UA is associated with a unilocular radiolucency having scalloped or lobulated border.5 The unicystic variant is less aggressive than its solid or multicystic counterpart and can be treated by enucleation or curettage.6,7 The reason for lack of insight about UA is due to paucity of published literature regarding this entity. This paper discusses different aspects of UA and highlights its diagnostic criteria.

Review: UA was first described as a distinct entity by Robinson and Martinez in 1977.8 In 1970, Vickers and Gorlin9 described three different histopathological features for UA which later on were modified in 1985 by Leider et al.7 and further in 1988 by Ackerman et al.10 and Ackerman et al. discussed a series of 57 UAs and discussed their histopathological features.10 They classified UA as shown in Table I.5

In the revised edition of the World Health Organization (WHO) histological typing of odontogenic tumors,12 a separate section has been added on UA due to its biological behavior. This implies that UA is a separate entity and should be differentiated from multicystic/solid/conventional ameloblastoma as this affects the management and possible outcome of the disease (Table II).

Literature search strategy: This is a traditional/narrative review on UA. The following search strategy was followed to gather information on the topic: classic references, case reports and original studies on UA were searched using the terms “ameloblastoma”, “unicystic ameloblastoma” and “odontogenic tumours” in PubMed and medline database from the year 1975 till 2014. Reports published only in the English language were included in the review. Anecdotal references were excluded from the literature.

Incidence and clinical presentation: UA tends to occur in a younger population compared to conventional ameloblastomas, with most tumours diagnosed during the second decade.1,13-16 Arora et al., discussed the UA in a 3-year girl, probably the youngest reported patient of UA in the English literature at that time.17 It has also been reported that UA is more commonly seen in children of Western countries as compared to children of Africa and Asia.18 Scientific literature suggests that UA initially presents clinically as a painless swelling, slow growing and relatively locally aggressive cystic lesion.14,20
Pathogenesis: Various controversies exist regarding the pathogenesis of UA till date. Leider et al. proposed three pathogenic mechanisms of evolution of UA; (1) Reduced enamel epithelium associated with a developing tooth which undergo ameloblastic transformation with subsequent cystic development; (2) Ameloblastomas arising in dentigerous cyst or other types of odontogenic cysts in which the neoplastic ameloblastic epithelium is preceded temporarily by non-neoplastic stratified squamous epithelial lining; (3) Solid ameloblastoma undergoes cystic degeneration of ameloblastic islands with subsequent fusion of multiple microcysts and developing into a unicystic lesion.

According to one school of thought, UA is the tumor arising de novo.10,21 Arora et al. suggested that UA are very often associated with impacted teeth and it has also been observed that the crown of the associated tooth is displaced by the cystic tumor rather than being projected into the cyst lumen.22

Another thought is that UA may develop by mural and/ or luminal ameloblastomatous changes in a pre-existing dentigerous cyst because of the coexistence of non-specific epithelial lining similar to that of a dentigerous cyst and ameloblastic epithelium.7,13,14 This eventuality would be further supported by the frequent involvement of an impacted tooth, mainly the third molar, and by the fact that many UAs are pre-operatively diagnosed as a cyst. Both theories are likely, although difficult to prove.23

Radiological appearance: UA appears as a well-demarcated radioluency on radiographs (Figure 1). More than half of the cases are seen in association with impacted tooth and the tumor mostly surrounds the crown of impacted tooth as commonly seen in radiographic features of dentigerous cyst.13,24 Ngwenya et al. suggested the use of the terms 'unilocular' and 'multilocular' rather than 'unicystic' and 'multicystic' to describe the radiological appearances of ameloblastoma.25

Harnet et al. have also opined that it is often difficult to distinguish UAs on panoramic view as well as on CT scan images because they appear as round unilocular radiolucencies. Konouchi et al. differentiated UAs from odontogenic cysts using Magnetic Resonance Imaging (MRI) by using contrast enhanced-MRI.

Histomorphological presentation: UA are monocyctic lesions with the epithelial lining characteristically showing basal cell layer composed of columnar cells with hyperchromatic, palisaded nuclei. Reversed polarity of nuclei is present and a subnuclear vacuole is present between the basement membrane and nucleus. Overlying layer is composed of stellate reticulum like cells (Figure 2A). Sometimes parakeratin layer is also noted and when keratinisation is present, an abrupt transition from the stellate reticulum like layer is usually observed.27 However, variability in epithelial lining of UA is also quite common, wherein it appears completely non-descriptive consisting of several layers of non-keratinising squamous cells mimicking radicular, residual and infected dentigerous cyst and it becomes really difficult to diagnose such cases. I suggest these findings from my clinical experience. Arora et al. added that diagnostic dilemma can be encountered especially in those cases where hyperplastic epithelium was growing into the underlying connective tissue and was associated with chronic inflammatory cell reaction. Such cases became difficult to differentiate from radicular cyst. Arcading proliferation of UA in particular is reminiscent of the arcading pattern seen in radicular cysts in response to inflammation (Figure 2B).22 Further overlapping clinical and radiographic features add to diagnostic difficulty.28

Biopsy methodology: Hsu et al. reported that biopsies consisting exclusively of non-specific epithelium, due to variability in the lining epithelium of UA, may be unable to reflect the true nature of the entire lesion. This kind of biopsy may lead to an incorrect diagnosis and subsequent inadequate treatment. Zhang et al. and Huang et al. also added that UA often clinically and radiographically mimics cystic lesions. A lack of a biopsy, along with a diagnosis solely dependent on clinical and radiographic findings, may give rise to considerable diagnostic problems and thus render the lesion either overestimated or underestimated.
Most of the researchers have opined that only a thorough sampling of the entire specimen can make accurate diagnosis of UA. For this reason, a final diagnosis of UA should never be based on incisional biopsy, as it might influence the surgical treatment of the oral surgeon.\(^3,22\)

Arora et al. also suggested that the true nature of the lesion becomes evident only when the completely excised tissue is available for the histopathological examination.\(^22\) The author suggests that the diagnosis of UA should be strictly based on combination of surgical, radiological and histopathological correlation. The lesion must be unicystic on examining the gross specimen, it should show unicocular radiculocyst on radiographs and microscopically it must appear as monocystic lesion with the classical ameloblastomatous lining as explained by Vickers and Gorlin (Table III).\(^9\)

**Management and prognosis:** UAs compare favorably with their solid counterparts in terms of clinical behavior and response to treatment.\(^31,32\) Treatment planning depends on the patient’s age, tumor size, location, radiographic appearance (unicocular or multicellular), final histopathological diagnosis and whether it is an initial presentation or a recurrence.

Conservative treatment is suggested, especially in younger populations, in light of the devastating impacts on the developing jaw, masticatory function, facial growth, and psychosocial aspects.\(^32-36\)

Curettage is acceptable for luminal and intraluminal UAs in cases where the tumor does not extend beyond the basement membrane of the cyst. Curettage is not effective for the complete surgical removal of mural UA which has recurrence rates closer to the conventional type when curetted only.\(^37,38\) Arotiba et al.\(^19\) have suggested that wide resection should be the treatment of choice in cases where follow-up examinations are limited and patients ignore their symptoms for long periods. Scarnot et al.\(^39\) opined that a more aggressive surgical approach should be used in recurrent lesions. Kalaskar et al. have suggested that marsupialization approach should be followed for extensive UA cases. This is done to reduce the size of the tumour so that less extensive surgery is required. Though this is not very popular approach, it can prove beneficial in severely ill patients and in extensive lesions.\(^40\)

Recurrence in UA following treatment is reported at approximately 7 - 25%,\(^41,42\) and is related to the histological type, site of origin, and initial treatment modality.\(^30,32\) The author, therefore, suggests that long-term follow-up should be done for UA because recurrence may appear even years after removal.

**CONCLUSION**

UA is a variant of ameloblastoma, occurs more commonly in second decade of life, presents clinically as a painless swelling in mandible and unicellular radiolucency in most of the cases. Conservative treatment is preferable for younger age group; though recurrence is more commonly observed with this approach. The author emphasizes that the diagnosis of UA should be strictly based on a combination of surgical, radiological and histopathological correlation.

**REFERENCES**

14. Kahn MA. Ameloblastoma in young persons: a clinico-


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