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Characteristic and Management of Ameloblastoma In Oral And Maxillofacial Surgery At Hasan Sadikin General Hospital: Retrospective Study

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Abstract

Introduction

Ameloblastoma is common benign epithelial tumor of odontogenic origin. The presentation of ameloblastoma is unique as it locally aggressive tumor with high recurrence rate if not treated adequately. This study aimed to conduct retrospective study to analyze the characteristics and management of ameloblastoma in patient Oral and Maxillofacial Surgery at Hasan Sadikin General Hospital between periods of January 2020 – December 2020.

Material and Method

This was a retrospective, descriptive feature of all histopathologically diagnosed ameloblastoma during 2020. We took data from each patient such as demographic (gender, age), radiological features, histopatholoical diagnosis, location, management, defect and reconstruction of ameloblastoma.

Result

A total 23 patients were diagnosed with conventional ameloblastoma, including 11 plexiform (48%), ten follicular (43%), and two mixed types of plexiform-follicular (9%). Among them, 6 (21%) patients were treated conservatively (Enucleation and dredging) and 17 patients were treated radically with segmental resection in 9 (39%) patients, hemimandibulectomy in 5 (22%) patients, marginal resection in 2 (9%) patients, and hemimaxillectomy in one (4%) patient.

Conclusion

The common characteristic of ameloblastoma is follicular and plexiform ameloblastoma with the most predilection location in mandible region and the peak of incidence in third decades of life. Radical treatment is more often used to reduce recurrence rates, whereas conservative measures are normally preserved in children and adolescent.

Keywords: Ameloblastoma, Epidemiology, Odontogenic, Tumour

Introduction

Ameloblastoma is common benign epithelial tumor of odontogenic origin characterized by slow, expansile growth and high recurrence rate if not treated adequately. Ameloblastoma accounts for approximately 1% of tumor in maxillofacial, [1] and 13-58% of total odontogenic tumor.[2] According to 2017 World Health Organisation (WHO) ameloblastoma is known as odontogenic lesions,[3] and divides amelobastoma into 4 types, conventional, unicystic, extraosseous/peripheral and metastasizing (malignant) ameloblastoma.

Each type of ameloblastoma have a different clinical feature and required different treatment.

Conventional type ameloblastoma that previously known as multicystic/solid type ameloblastoma is the most common subtype ameloblastoma making up about 91% of all cases ameloblastoma.[4] Ameloblastoma shows no clear sex predilection and is most commonly diagnosed in adults between third and fourth decades of life.[5] Posterior mandible especially the body, ramus, and angle of mandible is the common predilection site of ameloblastoma.[3,6,7] Ameloblastoma normally can be diagnosed according to radiographic examination and biopsy to assure the histopathology type of it.[8]

The management of ameloblastoma consisted of radical and conservative treatment. Conservative treatments including enucleation, enucleation and curettage, surgical excision and peripheral ostectomy and enucleation with liquid nitrogen cryotherapy or carnoy's solution. While radical treatments including segmental or marginal resection of this tumor. [9] According to Carlson and Marx[10] and Hong and et al[11], management and prognosis of ameloblastoma influenced by its types.

The literature has described a characteristic and management in the presentation of ameloblastoma in mandible and maxilla. The aim of this study was thus to evaluate the feature and management of ameloblastoma presenting in mandible and maxilla with emphasis on its radiographic, histopathological features, and compare the findings to other studies.

Material and Methods

This was a retrospective, case-series, descriptive study of ameloblastoma. This study followed the Declaration of Helsinki on medical protocol and ethics and regional Ethical Review Board of Universitas Padjadjaran approved the study (approval number of 1045/UN6.KEP/EC/2021). The study was a record review of patient demographic information (age and gender), radiographic presentation, histopathological features, management and reconstruction of ameloblastoma at KSM Oral and Maxillofacial Surgery of RSHS between the period of January 2020 to December 2020.

The age category in this study was the age at which the patients were diagnosed with ameloblastoma. They were grouped into 5 age groups: 0-10 years, 11-20 years, 21-30 years, 41-50 years and over 50 years. Gender was divided into male and female. Radiographic examination based on panoramic images and head CT scans, ameloblastoma is classified into 2 types: unilocular (when only one compartment was present) and multilocular (when numerous adjacent compartments were present).

Based on histopathological examination ameloblastoma is grouped into 7 types: unicystic, plexiform, follicular, acanthomatous, granular, basal cell and desmoplastic. The locations of ameloblastoma are grouped into 6 locations including anterior maxilla, left maxilla, right maxilla, anterior mandible, left mandible, and right mandible. While management of ameloblastoma is generally divided into: enucleation and dredging, marginal resection, segmental resection, and hemimandibulectomy/hemimaxillectomy.

Assessment of the maxilla and mandible defect is based on the classification of maxillectomy and mandibulectomy defect by Brown[12,13] (Figure 1 and 2). Reconstruction and rehabilitation of ameloblastoma is grouped including AO plat, graft, and prosthesis.

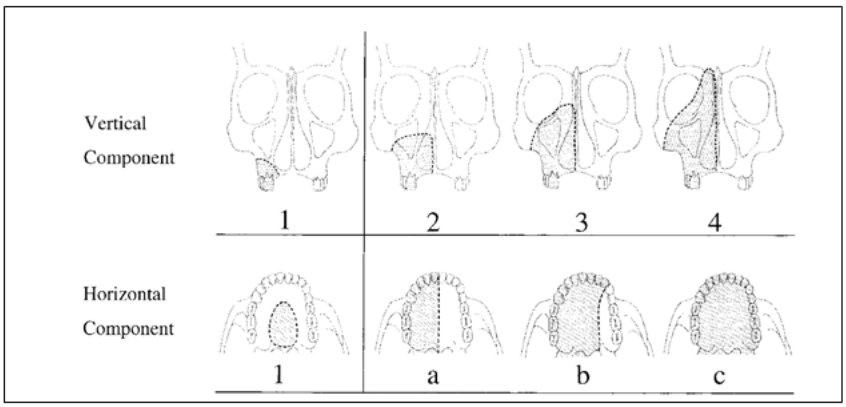

Figure 1: Classification Defect of Maxilla;

Vertical Component: Type I. Maxillectomy with no oro-antral fistula. Type II. Low Maxillectomy; Type III High Maxillectomy; Type IV Radical Maxillectomy. Horizontal Component: a. Unilateral; b. Bilateral (Incomplete); c. Complete

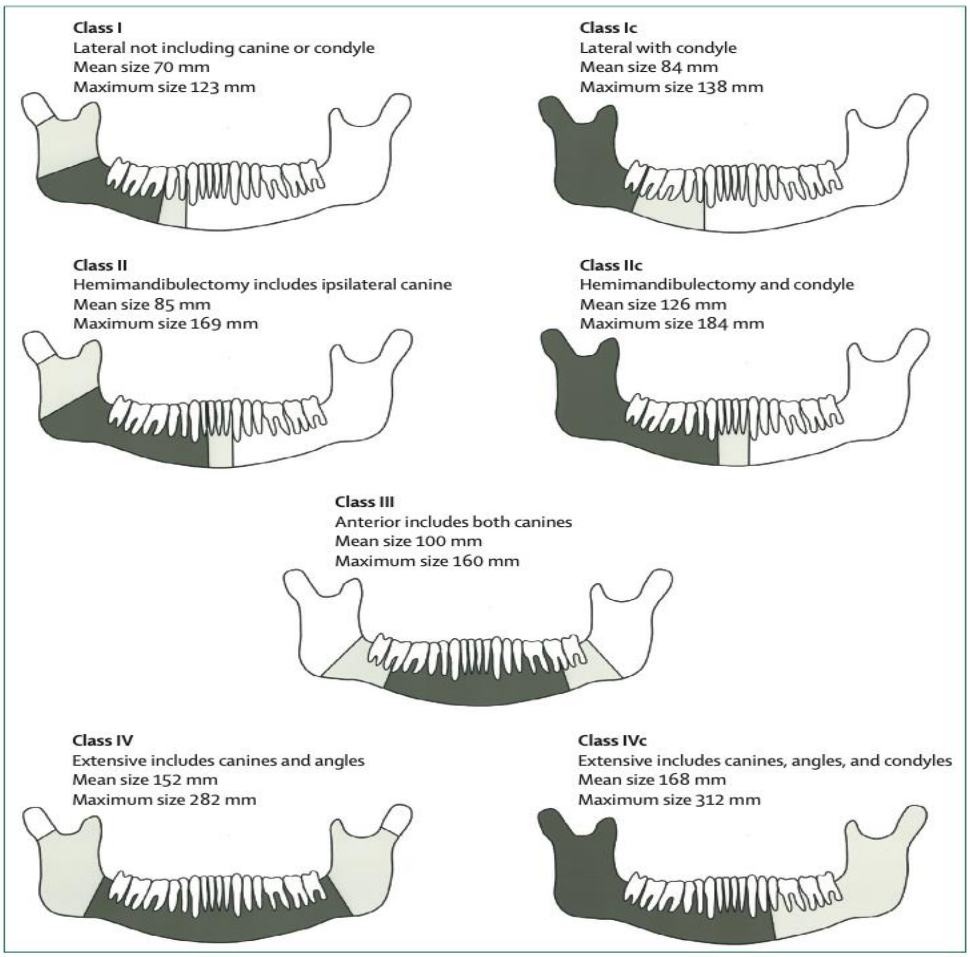

Figure 2: Classification Defect of Mandible.[13]

Result

A total of 23 patient records with a diagnosis of ameloblastoma were collected from the archives at KSM Oral and Maxillofacial Surgery of RSHS in the period between January 2020 to December 2020. The data showed 7 male patients (30%) and 16 female patients (70%) (Figure 3). The majority of patients were ranged from 21-30 years with 7 (31%) patients, followed by over 50 years with 5 (22%) patients, 31-40 years with 4 (17%) patients, 41-50 years and 11-20 years with 3 patients respectively, while the least of patients were ranged for 0-10 years with 1 (4%) patient (Figure 4).

A total of 23 specimen were diagnosed as conventional ameloblastoma using WHO 2017 head and neck odontogenic tumour classification. The subtypes included 11 plexiform (48%), ten follicular (43%), and two mixed types of plexiform-follicular (9%) (Figure 5). Radiographically, the majority conventional ameloblastoma appeared as multilocular lesions 18 (78%) patients with the remaining 5 (22%) patients appeared unilocular (Figure 6).

Based on the location, the majority of lesion involved mandible with 22 patient and one lesion at maxilla (Figure 7). With the location of mandible mostly presented at left mandible in 9 (39%) patients, followed by right mandible in 8 (35%) patients, and anterior mandible in 5 (22%) patients. While in maxilla the lesion presented in right maxilla.

Figure 8 shows that management for ameloblastoma was divided into conservative and radical management, with conservative management including enucleation with dredging in 6 (21%) patients while radical management including segmental resection in 9 (39%) patients, hemimandibulectomy in 5 (22%) patients, marginal resection in 2 (9%) patients, and hemimaxillectomy in one (4%) patient. Defect in maxilla and mandible in the case of maxillary ameloblastoma, involving 50% of the maxilla, not passing the midline in one patient, while in mandible ameloblastoma the defect majority involving less than half of the mandible bone in 11 patients (Figures 9).

Regarding the reconstruction and rehabilitation management, 13 (56%) patients were subjected to AO plate placement, 2 (9%) patients were reconstructed with non-vascularized graft costae, and 8 (35%) patients were reconstructed with prostheses (Figures 10)

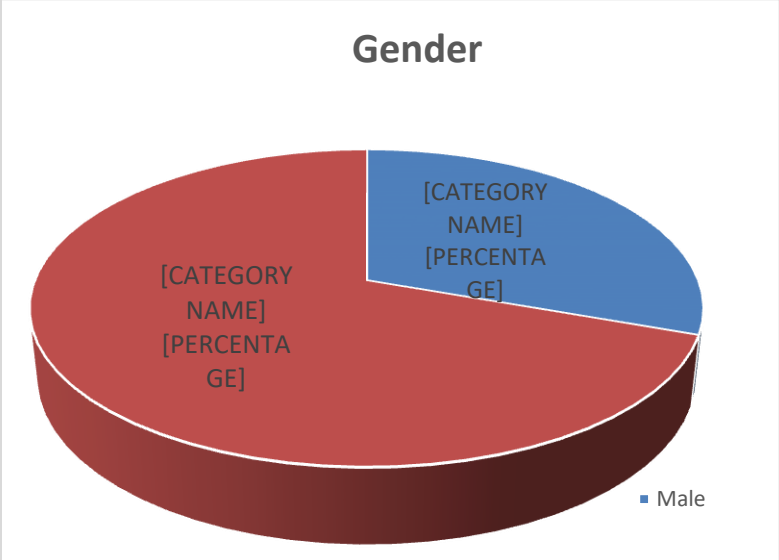

Figure 3: Gender Distribution of Ameloblastoma

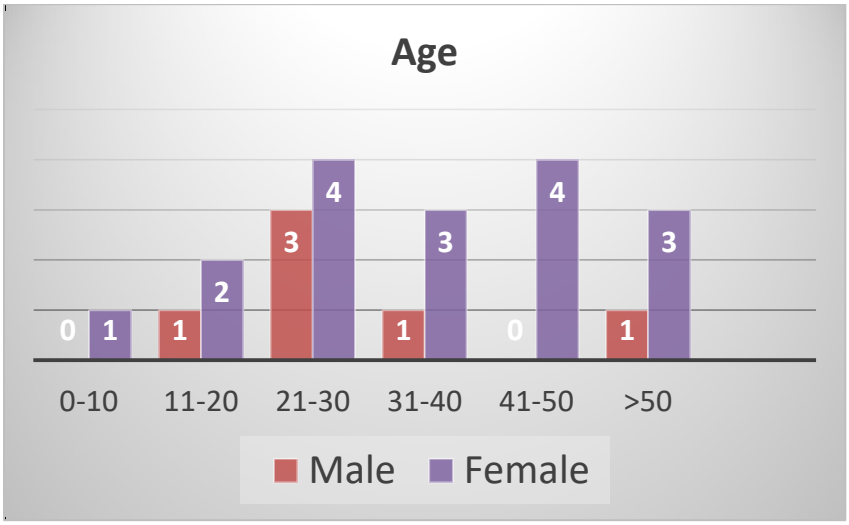

Figure 4: Age Distribution of Ameloblastoma

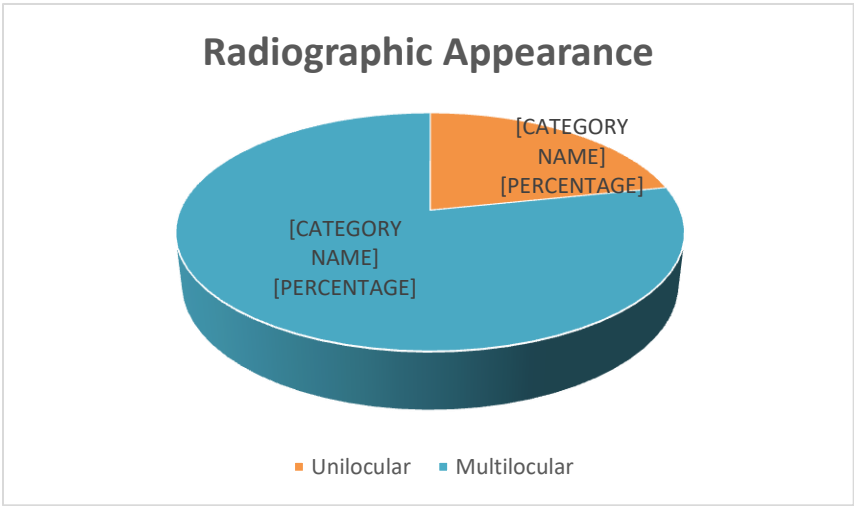

Figure 5: Radiographic Appearance

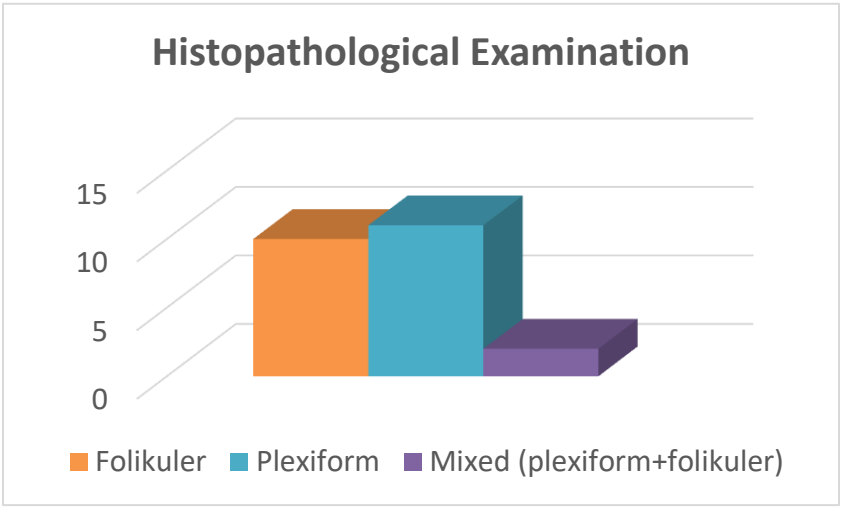

Figure 6: Histopathological Examination

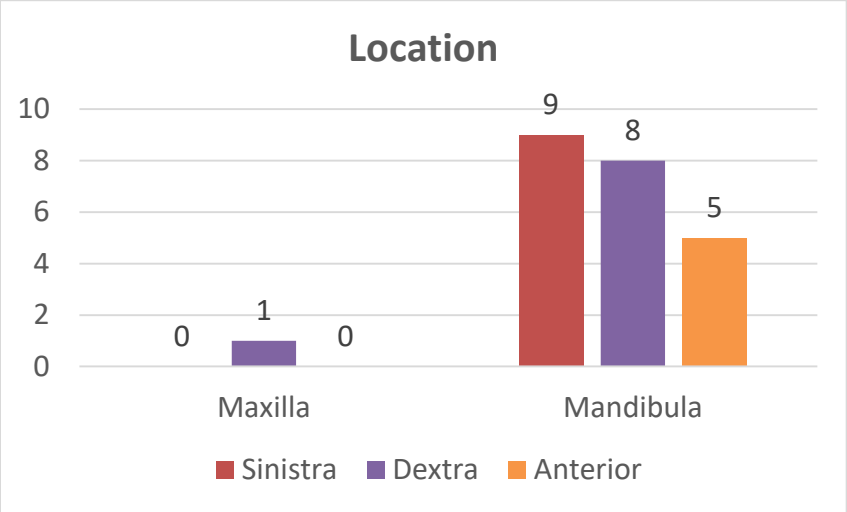

Figure 7: Location Distribution of Ameloblastoma

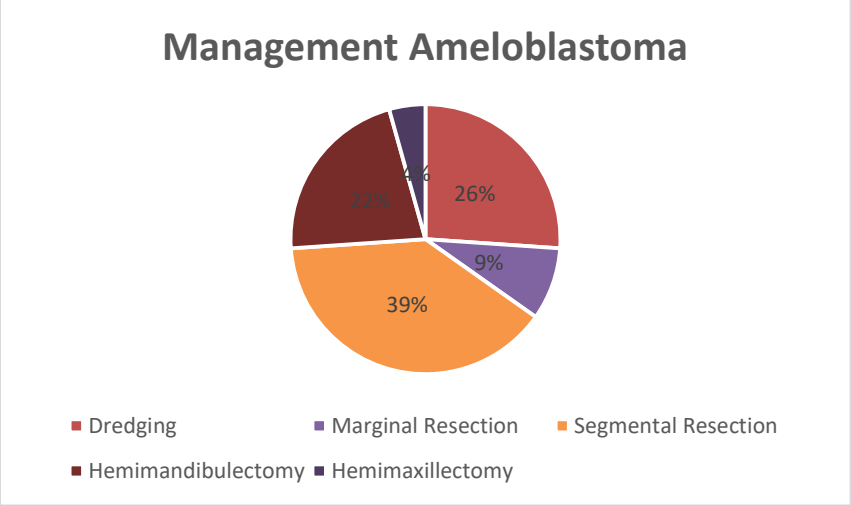

Figure 8: Management Ameloblastoma

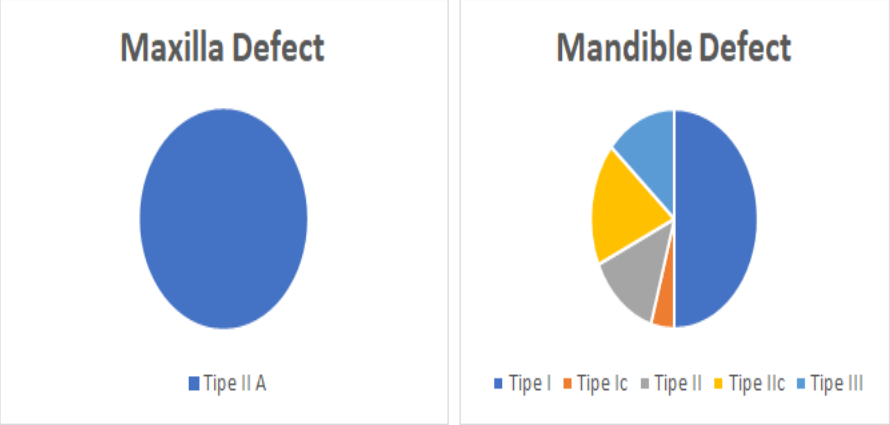

Figure 9: Maxilla and Mandible Defect

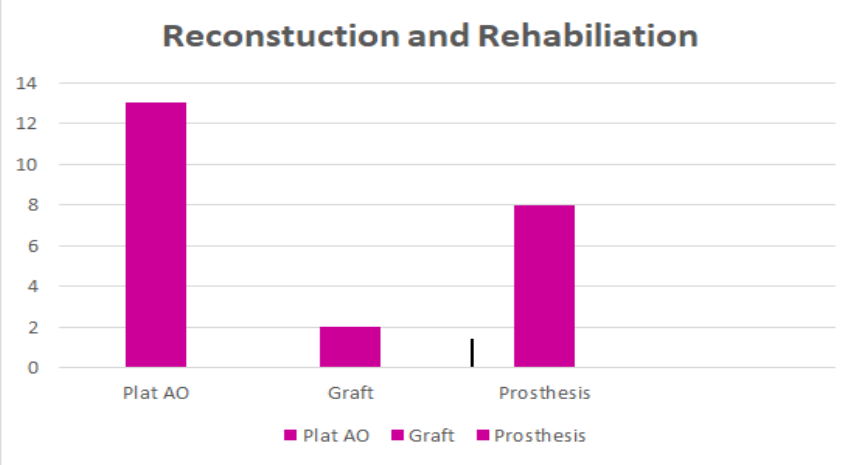

Figure 10: Reconstruction and Rehabilitation

Discussion

Ameloblastoma is a benign tumor that grows slowly but locally invasive which is painless and will destroy the bone structure surrounding it. Characteristics of ameloblastoma based on radiographic examination and anatomical pathology are very diverse, and further analysis is needed to determine the characteristics that often occur in patients at KSM Oral and Maxillofacial Surgery of RSHS. According to the data collection, the incidence of ameloblastoma that occurred and received treatment at the RSHS in the period January 2020 to December 2020 is 23 patients, with an average age of 35 years. This result is similar to the study conducted by Hendra et al[14], using *systematic review* and *meta-analysis* from the global incidence of ameloblastoma cases shows that the distribution of the mean age of ameloblastoma patients in the global community was 34.3 years, This strengthens the theory that the incidence of ameloblastoma is highest in the third to fourth decades. Fourth decades patient are generally found in some developing countries. This may be based on socioeconomic factors in developing countries where people in developing countries generally have poor nutrition and lack of access to health services. In the distribution of ameloblastoma patients by gender, this study found that ameloblastoma more often affects women than men. Based on primary data that has been obtained in patients diagnosed with ameloblastoma from a total of 23 patients, 7 men (30%) and 16 women (70%).

The mandible is the most common location in ameloblastoma cases where 96% of ameloblastoma patients occur in the mandible followed by the maxilla in 4%. These results are in accordance with previous studies, where the mandible is the most common site for ameloblastoma lesions to occur.[14,15]

The distribution of radiological examination in this study found that the most diagnosed ameloblastoma was multicystic ameloblastoma by 78% and unicystic ameloblastoma 22%. These results are in accordance with research conducted by Gandhi et al[32] which found that the most common population was multicystic ameloblastoma as much as 77% and the remaining 23% were unicystic ameloblastoma, in addition to that the research from Hendra et al[31] found 67.7% cases of ameloblastoma were multicystic followed by 26.2% unicystic, 3.6% desmoplastic and 1% peripheral. This indicates that the largest distribution of cases overall is multicystic ameloblastoma.[4]

Based on this study, follicular ameloblastoma (43%) and plexiform ameloblastoma (48%) were the two most common histopathological types of ameloblastoma, followed by *mixed type* which is a combination of plexiform and follicular ameloblastoma. (9%). The follicular type is the most common histopathological feature, except in

Asia where the plexiform type predominates.[14] As for histopathology, acanthomatous, granular and basal cell types are very rare types of ameloblastoma. These results are similar to the research conducted by Hendra et al. [14]

Management for the treatment of ameloblastoma can be divided into conservative treatment, and radical treatment. According to Almeida et al, conservative treatment in cases of multicystic ameloblastoma has a recurrence rate of 3.15 times greater than radical treatment.[16] Based on the data that has been obtained at RSHS, the most frequent treatment is radical treatment as much as 74% consisting of segmental resection, marginal resection, hemimandibulectomy and hemimaxilectomy followed by conservative measures as much as 26%. Radical surgery is more often used in RSHS because it aims to reduce the recurrence rate of ameloblastoma cases that occur, while conservative measures such as dredging are generally performed on ameloblastoma lesions that have a unicystic radiological appearance and in pediatric and adolescent patients, as well as adult patients with unilocular ameloblastoma. .

Defects that often occur in cases encountered in RSHS mostly occur in the mandible which provides class I defects by covering the angle of the mandible without involving the ipsilateral condyle and canine of the mandible, which is 47.8% of all ameloblastoma cases that occur in RSHS. According to research by Rameesh et al, in the Indian population, the majority of defects occurred in the mandible more than 50%, and the study by Tatapudi et al. stated that cases of ameloblastoma were more common and caused defects in the mandible in 80% patient. Based on these data, it can be concluded that ameloblastoma defects are more common in the mandible.[17,18]

Reconstruction performed in cases of ameloblastoma includes the application of AO plates, grafting, and making prostheses. In the cases that occurred in RSHS reconstruction, the most cases were the application of AO plates in 13 cases, prostheses in 8 cases, and grafting in 2 cases. The choice of reconstruction is based on the need and the extent of the defect that is caused by the surgery.[2.3]

Conclusion

According to this study on ameloblastoma characteristic and management at KSM Oral and Maxillofacial Surgery of RSHS between January 2020-December 2020, it was found that the majority of feature of in this population were similar to those previous reported in the literature. We found a slight female preference and the peak of incidence in third decades of life. Mandible is still the preferred site, and the most histopathologic patterns are plexiform and follicular type. The most performed management was radical surgery such as segmental resection, marginal resection, hemimandibulectomy and hemimaxillectomy to mitigate the recurrence rate, whereas the conservative management is still considered in children and adolescent.

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