

Evaluation of Resection Margin at 0.5 and 1 cm to Estimate the Adequacy of Resection in the Treatment of Multicystic Ameloblastoma

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ABSTRACT

Objective: To determine the tumor cell infiltration and estimate a safe resection margin in the treatment of multicystic ameloblastoma.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Oral & Maxillofacial Surgery, Mardan Medical Complex, Bacha Khan Medical College, Mardan Pakistan from January 2013 to June 2020.

Materials and Methods: Thirty patients with histopathologically and radiographically diagnosed as multicystic ameloblastoma were selected. Tumor resection including margin of 1cm adjacent to apparently normal bone was performed. The specimens were then assessed at two levels labelled as A and B, representing 0.5 cm and 1 cm margin respectively for histopathological evaluation.

Results: Mean age of the patients was 40.8±10.07 years. The most common age groups were second and third group. There were 17 males (56.6 %) and 13 females (43.4%). Twenty-two cases (73.3%) involved posterior mandible in body and ramus area. All patients were treated surgically depending upon the extent of the tumor. Among these 30 cases, marginal resection was carried out in 2 cases (6.7%), segmental resection in 13 cases (43.3%) and composite resection in 15 (50%) cases. Histopathology of resection margins were positive in 12 patients at 0.5 cm and negative in 18 patients, while margin was negative in all these 30 cases at 1 cm margin.

Conclusion: The tumor cells can infiltrate 0.5 cm deep into the adjacent clinically normal bone. Hence resection with a 1 cm safe margin of spongy bone may be an adequately conservative treatment for multicystic ameloblastoma.

Key Words: Resection margins, Tumor margins, Ameloblastoma

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INTRODUCTION

Ameloblastoma is common benign but locally invasive odontogenic polymorphic tumor of the jaws.¹ It may arise from odontogenic cyst epithelium and residual epithelial rests.² It usually affects children and adolescents, more often involving mandible than maxilla and occurring more commonly in males as compared to females.³

Ameloblastoma has various sub types among which multicystic variant is more common than others and is usually encountered in third to seventh decade of life.⁴ About 85% of multicystic ameloblastoma occur in mandible and 15 % occur in maxilla.⁵ Radiographically multicystic ameloblastoma present as multilocular radiolucent lesion and may present as “soap bubble” or “honeycombed” appearance.⁵ Multicystic ameloblastoma can be histologically classified as plexiform (55.3%), follicular (37.6%), basaloid (3.5%), acantomatous (1.4%), granular cells (1.4%), and desmoplastic (0.8%).^{5,6}

The multicystic ameloblastoma frequently infiltrate the cancellous bone but invasion of cortical bone is infrequent.⁷ Solid ameloblastoma is more aggressive in nature with high recurrence rate.^{8,9} It may damage adjacent organs like eye and nose leading to functional disability and in addition to this local destruction of jaw bones, the tumour can also metastasize to lungs and kidneys and may even transform into ameloblastic carcinoma.^{10,11}

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Because of its recurrent nature, conservative approach advocated by some has lost ground in favor of more radical surgical approach and the treatment modalities like curettage, chemical cauterization of the walls of lesion or electro-cauterization are now only of historical importance.¹² Overall recurrence rate varies from 7.1% to 45.5%.¹³ In radical surgery lesion is excised with a margin of "normal bone".¹⁴ Several studies have been conducted regarding the removal of lesion along with uninvolved bone with various suggested resection margins of 5mm, 1cm, 1.5cm and even up to 2 cm.¹⁵⁻¹⁷ Extensive resection is always undesirable as it can lead to functional impairment and esthetic defects in regards to facial region that are difficult to reconstruct. The purpose of this study was to determine the tumor cell infiltration at 0.5cm and 1cm on the histopathological examination to estimate a safe resection margin for multicystic ameloblastoma.

MATERIALS AND METHODS

This study was conducted in Department of Oral & Maxillofacial Surgery, Mardan Medical Complex, Bacha Khan Medical College, Mardan Pakistan from 1st January 2013 to 30th June 2020. Patients of any age group and either gender with histopathologically and radiographically proven as multicystic ameloblastoma were selected in this study. Lesion involving the maxilla and vital structures like base of skull were excluded from the study. The confounding variables like age, sex and site of the tumor were adjusted by stratification. Investigations included; routine investigations and special investigations like orthopantomogram (OPG), x-ray posteroanterior (PA) face, 3D CT scan, and histopathological examination. An informed consent was obtained from the patients or their parents/guardians. The whole mass of the tumor was either directly removed with 1cm safe margin or curettage of the lesion was performed first followed by resection with 1 cm margin of adjacent apparently normal bone. The whole specimen was then examined at two levels i.e. 0.5 cm and 1 cm margin labelled as level A and B respectively. The histopathological result achieved, were then reviewed. The collected data was entered in SPSS version 22 and analyzed.

RESULTS

Mean age of the patients was 40.8±10.07 years. The most common age groups were second and third group. There were 17 males (56.6 %) and 13 females (43.4%). Multicystic ameloblastoma was more common in posterior mandible as compared to anterior part. In all these patients only 8 cases (26.6%) were observed in anterior part while the rest 22 cases (73.3%) involved posterior mandible in body and ramus area. All patients were treated surgically depending upon the extent of the tumor. Among these 30 cases, marginal resection was

carried out in 2 cases (6.7%), segmental resection in 13 cases (43.3%) and composite resection in 15 (50%) cases (Table 1). Histopathology of the resection margin of 1 cm was carried out at two levels i.e. 0.5 cm (level A) and 1cm (level B) in all 30 cases of multicystic ameloblastoma. Resection margins were positive in 12 patients at 0.5 cm and negative in 18 patients, while margin were negative in all these 30 cases at 1 cm (Table 2).

Table No.1: Demographic information of the patients (n=30)

Variable	No.	%
Age (years)		
21-30	5	16.7
31-40	11	36.7
41-50	11	36.7
51-60	3	10.0
Gender		
Male	17	56.6
Female	13	43.3
Site of multicystic ameloblastoma in mandible		
Anterior mandible	8	26.6
Posterior body/Ramus	22	73.3

Table No.2: Histopathological result of specimen

Histopathology result	No.	%
At 0.5 cm		
Positive	12	40.0
Negative	18	60.0
At 1 cm		
Positive	-	-
Negative	30	100.0

DISCUSSION

The most common age of patients observed in our study was between 3rd to 5th decades of life. The mean age being 40.8 years, which is comparable with previous studies by Di Cosola et al¹⁸, who have shown mean age of such patients with multicystic ameloblastoma to be 39.6 years. Zhang et al¹⁹ studied odontogenic tumors in Chinese population and Adebisi et al²⁰ conducted a similar study in Nigerian population both confirming these tumors to occurring more frequently in 4th decade of life. In contrast to these studies the patients presented to us showed increased frequency in 5th decade of life. Male to female ratio in our study was being 1.3:1, which is more or less similar to previous studies conducted worldwide, as no significant predominance between genders.¹⁸⁻²⁰ The multicystic ameloblastoma is more common in the posterior parts of the jaws as reported by various studies conducted around the world. This was confirmed in our study as in 22 cases tumor has involved body and ramus of mandible.^{21,22} We found that the tumor cells can infiltrate up to 0.5 cm of adjacent clinically healthy bone, which strongly contradicts the conservative management of

ameloblastoma propagated by some researchers.^{23,24} All resection margins at 1cm distance from lesion were free of tumor cells. Curettage involves eradication of macroscopically visible mass of tumor by scraping procedure. Similarly Carnoy's solution has been used by some authorities in the treatment of conventional multicystic ameloblastoma as adjunct to curettage.²⁵ Sehdev²⁶ reported 90% recurrence rate mandibular ameloblastomas after curettage. Subsequent resection could control 80% of recurrences.

D'Agostino et al²⁷ observed 28.57% recurrence following enucleation and curettage while 0% seen in wide bone resection. He suggested conservative surgical treatment should be considered only in unicystic lesions when extraosseous spread has not yet occurred. In multicystic the most appropriate therapeutic approach appears to be an 'extended surgical resection' of the tumor. The conservative treatment has poor outcome as compared to radical treatment.²⁸

Literature regarding the surgical safe margin is much confusing because of conflicting ideas of many researchers. Majority of the studies suggested surgical margins based on the assumptions of tumor behavior rather than on histological reviews of tumor histopathological margins. In this study, the infiltration of tumor into the adjacent cancellous bone was investigated, and the appropriate resection margin was suggested based on histopathology rather than merely on assumptions.

Gortzak et al⁹ stated that ameloblastoma has invasive growth pattern in the cancellous bone, with smaller tumor nests present at a depth of 5 mm from tumor with extensive and infiltrative invasion of the Haversian canals. They recommended resection of tumor with 1 cm safe margin similar to our study. Marx et al²⁹ reported that ameloblastoma extend 2.3–8 mm beyond the radiographic margin and because of this microscopic infiltration they advocated resection of 1 cm of normal appearing bone. The invasive borders of ameloblastoma have been reported to be diffuse, and some authors have suggested resection with a 1.5-3cm margin of normal bone.^{16,21,30}

It is worth mentioning here that the removal of 2-3 cm of adjacent bone at times may create a continuity defect or other functional and esthetic deformity that some clinician may wish to preclude in treatment of a benign nevertheless a locally aggressive pathology that needs to be treated adequately but still conservatively.^{27,28}

CONCLUSION

Multicystic ameloblastoma is predominant in 3rd and 4th decade of life and involve mostly the posterior part of mandible. The tumor cells can infiltrate 0.5 cm but rarely up to 1cm deep into the adjacent clinically normal bone. Hence resection with a 1 cm safe margin

of spongy bone may be an adequate treatment for multicystic ameloblastoma.

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Author's Contribution:

Concept & Design of Study: Sartaj Khan
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