

Clinico-pathological study of odontogenic cysts and tumours at a tertiary care dental hospital of Nepal

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Abstract

Background: Diagnosis of odontogenic cysts and tumours requires detailed clinical, radiographical, and histopathological findings. Fourth edition WHO 2017, classification of Head and Neck lesions, has reclassified odontogenic cysts and tumours.

Objectives: To know relative frequency of odontogenic cysts and tumours according to WHO 2017 classification and to know their clinico-pathological characteristics in selected population of Nepal.

Methods: An analytical cross-sectional study was done in 163 biopsies. Data were obtained conveniently from records of patients diagnosed with odontogenic cysts and tumours from April 2014-2021. Cases with complete clinical details were included whereas non-odontogenic cysts, oral soft tissue, and salivary gland lesions were excluded. Reclassification according to WHO 2017 classification was done. Age, gender, site, clinical presentations, and histological type were analysed using SPSS v.21.

Results: In total of 163 biopsies, 120 (73.62%) cases were of odontogenic cysts and 43 (26.38%) cases were of odontogenic tumours. The mean age of occurrence for cysts was 33.35 ± 16.67 years and for tumours was 28.91 ± 13.96 years. Radicular cyst (49/120, 40.83%) and conventional ameloblastoma (23/43, 53.48%) were the commonest cysts and tumours. Male (67/120, 55.83%) and female (24/43, 55.81%) predisposition was seen in cysts and tumours. Mandibular middle and posterior region were commonly affected in both cysts (58/162, 35.8%) and tumours (38/53, 71.7%).

Conclusion: Increased frequency of radicular cysts and conventional ameloblastoma were appreciated with male predisposition in tumours and female predisposition in cysts. Both cysts and tumours were common in second to third decade of life affecting middle and posterior region of mandible.

Key words: Odontogenic cysts; Odontogenic tumour; Pathology.

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INTRODUCTION

Cysts and tumours of odontogenic origin are derived from embryonic odontogenic tissues. A diverse group of these lesions reflects the complex development of the dental structures.¹ The diagnosis of odontogenic cysts (OCs) and odontogenic tumours (OTs) require a detailed analysis of clinical, radiographical, and histopathological findings. These lesions are of importance because of their direct concern with patients' facial aesthetics and masticatory function therefore, early diagnosis of these lesions may prevent unfortunate surgical interventions.² The treatment of choice is governed by several factors such as the size, location of the lesion, and involvement of adjacent anatomical structures.¹ In 2017, the fourth edition of the World Health Organisation (WHO) classification of Head and Neck was published, wherein odontogenic cysts and odontogenic tumours were reclassified and some new entities were added.³ To the best of authors' knowledge, no studies have been done in the Nepali population

which may be attributed to inconsistency in data and inadequate documentation regarding these lesions.

The present study has been designed to know the relative frequency of odontogenic cysts and tumours according to the new WHO 2017 classification and to know their clinico-pathological characteristics in the selected population of Nepal.

METHODOLOGY

This analytical cross-sectional study was carried out in the Department of Oral and Maxillofacial Pathology, Kantipur Dental College and Teaching hospital from June 2021 – Nov 2021. Data were retrospectively collected of the patients who were diagnosed histopathologically as odontogenic cysts and tumours from April 2014 to April 2021. Ethical approval was taken before conducting the study from IRC-Kantipur Dental College and Teaching Hospital (Ref. 23/021). Findings of clinical history and physical examination were noted from the patient's record book. The parameters included in the study were age, gender, site, clinical presentations, and histopathological diagnosis of the lesion. The histopathologically diagnosed cases were reclassified according to the new WHO 2017 classification by Oral Pathologists. Soft tissue lesions in the oral cavity, salivary gland lesions, and non-odontogenic cysts were excluded.

Convenience sampling method was used and the sample size was calculated using the formula: $n = z^2 pq/e^2$; where, n = required sample size; z = confidence interval; p = 0.286 (28.6% prevalence);⁴ q = 1- p ; e = 0.07 (7% maximum permissible error). Hence, $n = 160.09 \approx 163$. Frequency analysis and Pearson's chi square test was done for the entire cases recorded using SPSS version 21. The p -value of <0.05 with a 95% confidence interval was set.

RESULTS

The study included a total of 163 biopsy cases. Among which 120 (73.61%) cases were of odontogenic cysts and 43 (26.39%) cases were of odontogenic tumours. Odontogenic cysts were seen in patients with the age range of 7-83 years with a mean age of 33.35 ± 16.67 years. Among the OC's, Radicular cysts were the most common comprising 49 (49/120, 40.08%) cases and the least common being Residual cyst with two cases (2/120, 1.7%) (Figure 1). The frequency of OC was found to be more in males (67/120, 55.8%) than females (53/120, 44.2%). The OCs were more common in mandibular middle and posterior region (58/16, 35.5%) and least

common in mandibular anterior (11/162, 6.8%) (Table 1). Among the age groups, OCs were most common in patients aged between 15-29 years in 52 (43.3%) cases (Table 1). Patients mostly visited with swelling (74/162, 45.7%) followed by impacted tooth (25/162, 15.4%), decayed tooth (7/162, 4.3%), non-vital tooth (11/162, 6.8%), and with history of trauma (3/162, 1.9%). There were 40 (40/162, 24.7%) cases with no clinical presentation written on the case history sheet. Among the cases of OC's most (5/162, 32.7%) were asymptomatic followed by pain (26/162, 16%), pain with swelling (11/162, 6.7%), pain with discharge (7/162, 4.3%), swelling with discharge (2/162, 1.2%), and tissue growth (1/162, 0.6%). There were 63/162 (38.9%) cases with no clear signs and symptoms.

Odontogenic tumours were seen in patients with the age range of 4-75 years with a mean age of 28.91 ± 13.96 years. Conventional Ameloblastoma (23/43, 54.7%) was the most common odontogenic tumour, the least common (1/43, 1.9%) being Calcifying epithelial odontogenic tumour and Ameloblastic fibroma (Figure 2). Among the genders females (24/43, 55.8%) were more commonly affected than males (19/43, 44.2 %) (Table 2). OT was common (22/43, 51.2%) in 15-29 years age group (Table 2). The common site for OT was the mandibular middle and posterior region (38/53, 71.7%) with the least common site being mandibular anterior (3/53, 5.7%) (Table 2). The patient commonly came with swelling (23/53, 43.4%) followed by facial asymmetry (6/53, 11.3%), tissue growth (4/53, 7.6%), retained tooth (3/53, 5.7%), impacted tooth (2/53, 3.8%) and with history of resected mandible (1/53, 1.9%). There were (13/53, 24.5%) cases with no clinical presentation recorded. Most of the patients with odontogenic tumours were asymptomatic (23/53, 43.4%) in nature, pain (3/53, 5.7%), pain and swelling (2/53, 3.8%), pain with discharge and swelling with discharge (1/53, 1.9%). There were 23(43.4%) cases with no clear signs and symptoms.

In current study, there was no significant association between age ($p=0.806$), gender ($p=0.415$), and different types of OCs whereas there was a significant association ($p<0.05$) between the site of the lesion and different types of OCs (Table 1). Similarly, no significant association was found between age ($p=0.06$), gender ($p=0.549$), and histological diagnosis of OTs whereas a significant association was found between the site of the lesion ($p<0.05$) with the histological diagnosis of OT (Table 2).

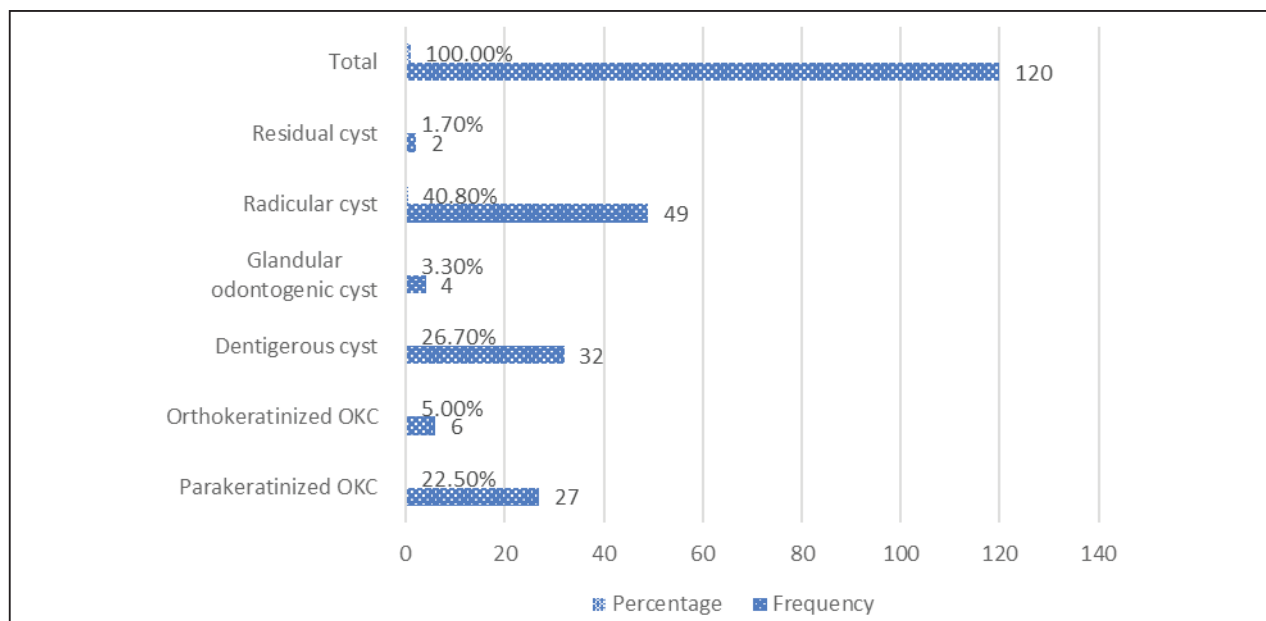


Figure 1: Frequency distribution of odontogenic cysts in tertiary care dental hospital of Nepal n(%)

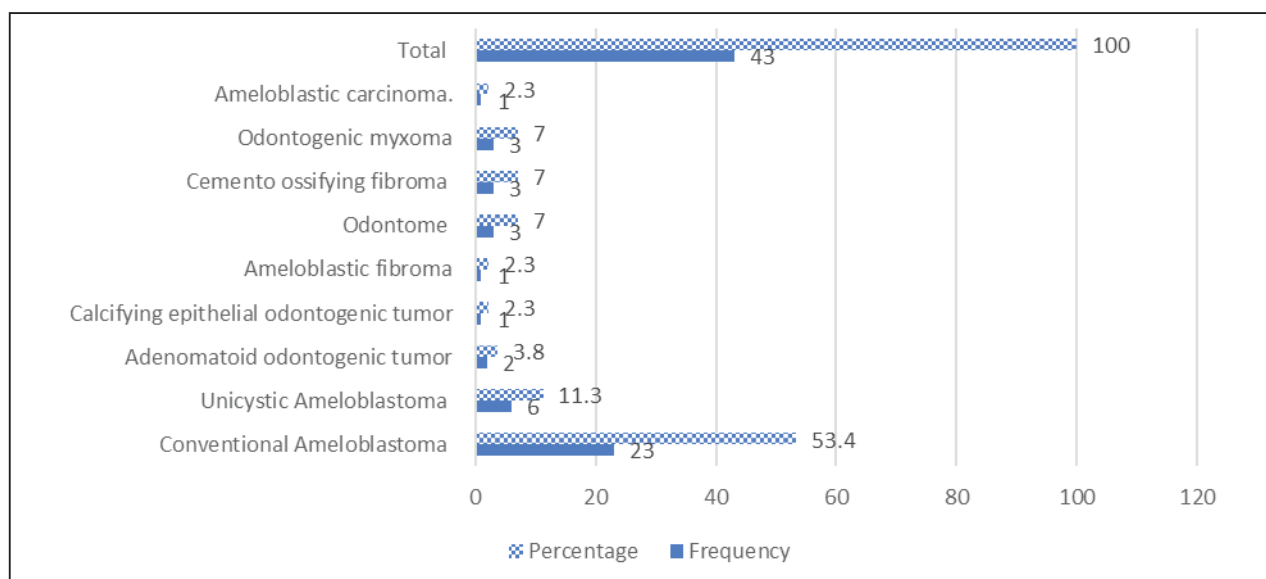


Figure 2: Frequency distribution of odontogenic tumour in tertiary care dental hospital of Nepal, n (%)

Table 1: Distribution and correlation of odontogenic cysts based on age, site of lesion, and gender

Variables	Para keratinised OKC	Ortho keratinised OKC	Dentigerous cyst	Glandular odontogenic cyst	Radicular Cyst	Residual Cyst	Total	Chi square test (p-value)
Age	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
<14	1 (0.8)	-	4 (3.3)	-	3 (2.5)	-	8 (6.7)	
15-29	12 (10.0)	4 (3.3)	16 (13.3)	2 (1.7)	18 (15.0)	-	52 (43.3)	
30-59	12 (10.0)	2 (1.7)	9 (7.5)	1 (0.8)	22 (18.3)	2 (1.7)	48 (40.0)	
>60	2 (1.7)	-	3 (2.5)	1 (0.8)	6 (5.0)	-	12 (10.0)	
Total	27 (22.5)	6 (5.0)	32 (26.7)	4 (3.3)	49 (40.8)	2 (1.7)	120 (100)	0.806 (NS)

Site of lesion	Max Ant	6 (3.7)	2 (1.2)	12 (7.4)	3 (1.9)	31 (19.1)	1 (0.6)	55 (34.05)	
	Max middle and Post	14 (8.6)	-	4 (2.5)	4 (2.5)	16 (9.9)	-	38 (23.5)	
	Mand Ant	2 (1.2)	-	4 (2.5)	-	5 (3.1)	-	11 (6.8)	
	Mand middle and Post	23 (14.2)	6 (3.7)	17 (10.5)	-	10 (6.2)	1 (0.6)	58 (35.8)	
Total		45 (27.8)	8 (4.9)	37 (22.8)	7 (4.3)	62 (38.3)	2 (1.2)	162 (100.0)	0.001
Gender	Male	14 (11.7)	3 (2.5)	14 (11.7)	2 (1.7)	32 (26.6)	2 (1.7)	67 (55.8)	
	Female	13 (10.8)	3 (2.5)	18 (15)	2 (1.7)	17 (14.2)	-	53 (44.2)	
Total		27 (22.5)	6 (5.0)	32 (26.7)	4 (3.3)	49 (40.8)	2 (1.7)	120 (100.0)	0.415 (NS)

OKC= Odontogenic keratocyst

Table 2: Distribution and correlation of odontogenic tumour based on age, site of the lesion and gender

Variables	CA	UA	AOT	CEOT	AF	Odontoma	COF	Od myxoma	ACA	Total	Chi square test (p-value)	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)		
Age	<14	1 (2.3)	-	-	-	1 (2.3)	2 (3.8)	-	1 (2.3)	-	5 (11.6)	
	15-29	13 (30.2)	3 (7.0)	2 (4.7)	1 (2.3)	-	1 (2.3)	2 (4.7)	-	-	22 (51.2)	
	30-59	8 (18.6)	3 (7.0)	-	-	-	-	2 (4.7)	1 (2.3)	14 (32.6)		
	>60	1 (2.3)	-	-	-	-	-	1 (2.3)	-	-	2 (4.7)	
Total		29 (54.7)	6 (11.3)	2 (3.8)	1 (2.3)	1 (2.3)	3 (7.0)	3 (7.0)	1 (2.3)	43 (100.0)	0.066 (NS)	
Site of the lesion	Maxillary anterior	-	-	2 (3.8)	-	-	3 (5.7)	1 (1.9)	-	-	6 (11.3)	
	Maxillary middle and posterior	3 (5.7)	1 (1.9)	-	-	-	-	1 (1.9)	1 (1.9)	-	6 (11.3)	
	Mandibular anterior	2 (3.8)	-	-	-	-	-	-	-	1 (1.9)	3 (5.7)	
	Mand middle and posterior	24 (45.3)	5 (9.4)	-	1 (1.9)	1 (1.9)	1 (1.9)	2 (3.8)	3 (5.7)	2 (3.8)	38 (71.7)	
Total		29 (54.7)	6 (11.35)	2 (3.8)	1 (1.95)	1 (1.9)	4 (7.5)	3 (5.7)	4 (7.5)	3 (5.7)	53 (100.0)	0.01
Gender	Male	11 (25.6)	2 (4.7)	1 (2.3)	-	1 (2.3)	1 (2.3)	-	2 (4.7)	1 (2.3)	19 (44.2)	
	Female	12 (27.9)	4 (9.3)	1 (2.3)	1 (2.3)	-	2 (4.7)	3 (7.0)	1 (2.3)	-	24 (55.8)	
Total		23 (53.5)	6 (14.0)	2 (4.7)	1 (2.3)	1 (2.3)	4 (7.0)	3 (7.0)	3 (7.0)	1 (2.3)	43 (100.0)	0.549 (NS)

CA= Conventional Ameloblastoma, UA= Unicystic Ameloblastoma, AOT= Adenomatoid odontogenic tumour, CEOT=Calcifying epithelial odontogenic tumour, AF= Ameloblastic fibroma, COF= Cemento ossifying fibroma, Od. myxoma= Odontogenic myxoma, ACA=Ameloblastic carcinoma.

DISCUSSION

Jaw lesions mostly comprise of cysts and tumours of odontogenic origin. Studies of cysts and tumours of the oral cavity from several parts of the world indicate that information regarding the frequency, site and their clinical features are essential to evaluate the presentation of these lesions in diverse populations and also to identify the risk group.⁵ The new fourth edition, WHO 2017 classification has reincorporated some odontogenic cysts, classified tumours with the addition of new entities, and has taken the current rapid rate of discovery of genetic and molecular alterations into consideration.⁶

The present study comprised of more than half (120, 73.6%) cases of odontogenic cysts which were developmental and inflammatory in origin. This finding was in accordance to studies done in Indian,¹ Turkish,² UAE⁵ and in South Brazil⁷ population. Radicular cyst was the most common (49/120, 40.80%) followed by dentigerous cyst (32/120, 26.70%) and parakeratinised odontogenic keratocyst 27(22.50%). This was similar to the study by Igzi et al.² in Turkish, Al-Rawi et al.⁵ in UAE and Kambalimath et al.⁸ in the Indian sample. These lesions accounted for 90% of total sample which was similar to other studies in various countries.^{2, 8} In this study there were six (5.0%) out of 120 cases of orthokeratinised odontogenic cyst which has been added as a new entity in WHO 2017 classification.³ In the present study mean age of occurrence of OC's was 33.35 ± 16.67 years which was similar to findings from the Indian⁸ and UAE⁵ population while in the Turkish sample it was found to be more common in 5th decade of life.² Gender distribution indicated more of Male 67(55.8%) predisposition which was similar to study in Indian¹ and Turkish² population. Whereas female predisposition was noted in South Brazilian⁷ population. Patients in the present study with OC came with complaints of swelling (74/162, 45.7%) which was mostly asymptomatic (53/162, 32.7%) in nature. These clinical features would be apt considering the majority of this study sample comprised of Radicular cyst, Dentigerous cyst, and Odontogenic keratocyst.⁹ Asymptomatic nature of radicular cyst may be attributed to defective immunological surveillance and suppressive mechanism.⁹

Odontogenic tumours comprised 43(26.3%) cases of the total sample wherein Conventional Ameloblastoma (29/43, 54.70%) was the most common OT followed by Unicystic Ameloblastoma and Odontome (4/43, 7.5%). These findings were similar to the study done by Avelar et al.¹⁰, Ramachandra et al.¹ and Nalabolu et al.¹¹ In contrast to this, study by Al Rawi et al.⁵ in UAE and Igzi

et al.² in Turkish population found odontoma to be more prevalent. These discrepancies probably result from geographic variation and also may be attributed to the unique clinical presentation of Odontomas leading to its underestimation.¹ Most of the odontomas are self-limiting with no clinical symptoms, hence patients may not be aware or may not consult the oral maxillofacial surgeons leading to a lack of case records. This study comprised of three (5.7%) out of 43 cases of cemento ossifying fibroma which has been added to WHO 2017 classification under OT of mesenchymal origin.³ Among the benign OTs, calcifying epithelial odontogenic tumor and ameloblastic fibroma were the least reported (1/43, 2.3%) which was similar to the study by Igzi et al.² in the Turkish population. A single (2.3%) case was reported of Ameloblastic carcinoma which may support benign OTs to be more common than the malignant entity.⁹ In the present study mean age for occurrence of OTs was 28.91 ± 13.96 years, similar to the study done in Iran¹² and India¹³, whereas it was in contrast to the study done in Turkey.² Female preponderance (24/43, 55.8%) was seen in the study which was similar to the study done in Brazil¹⁴ and Iran¹⁵. Patients in the present study with OT came with complaints of swelling (23/53, 43.4%) which was mostly asymptomatic (23/53, 43.4%) in nature. Since Ameloblastoma was the commonest type of OT in this study, slow growing painless swelling causing facial asymmetry were common complaints in patients with this tumour.⁹

The mandibular middle and posterior region were commonly involved by OCs and OTs which was similar to the study by Igzi et al.², Al Rawi et al.⁵ and contrast to the findings of Kambalimath et al.⁸ were in maxilla was the common region for these lesions. The present study showed a statistically significant ($p < 0.05$) association of location with both OC's and OT's which may be clarified by results from other studies showing mandibular predisposition similar to this study.^{2,5} Further Genetic studies have shown BRAF mutation to be involved in the pathogenesis of Ameloblastoma. Likewise, ameloblastoma in Mandible showed more prevalence of this mutation, which may explain mandible being a common site of occurrence for Ameloblastoma.⁶

Odontogenic cysts of inflammatory origin were found to be more prevalent in this study sample compared to odontogenic tumours. The lower prevalence of odontogenic tumours may be due to the fact that it is rare in the Nepali population or maybe due to lack of proper diagnostic methods and proper documentation. In the present study, an attempt was made to know the relative frequency of odontogenic cysts and tumours

and its association with the clinical parameters in the Nepali population sample. Since the data recorded in this study was from single center, multi centered data with a larger sample size are recommended for better demographic distribution and clinicopathological correlation of Odontogenic cysts and tumours in the Nepali Population.

CONCLUSION

The present study done in Tertiary care dental hospital showed radicular cysts as the common odontogenic cysts whereas conventional ameloblastoma was the commonest odontogenic tumour in the studied sample. There was an increased predisposition to males in odontogenic cysts and females in odontogenic tumours.

Both the cysts and tumours were common in the 2nd to 3rd decade of life affecting the middle and posterior region of the mandible.

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