

Clinical and histopathological correlation of Odontogenic Lesions :A Study of 41 cases in a tertiary care centre

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Abstract: Introduction: The term "odontogenic tumors" comprises a group of neoplasms and hamartomatous lesions derived from cells of tissues involved in the formation of teeth or remnants of tissues that has been involved in the Odontogenesis¹. The tumors occur exclusively in three locations (i) intraosseous (centrally) in the maxillofacial skeleton (ii) extraosseous (peripherally) in the gingiva or alveolar mucosa overlying tooth bearing areas. They arise de novo without any causative factor². Developmental odontogenic cysts may contribute to the formation of some Odontogenic tumors and Intraosseous Squamous cell carcinoma.

Materials and methods:- The present study was carried out in the Department of Pathology, Siddhartha Medical College, Vijayawada in the period between January 2016 to December 2017. Total number of cases were 41.

Results: Of 41 cases, 13 cases were odontogenic cysts and 28 cases were odontogenic tumours. 21 lesions were in mandible and 20 were in maxilla. Ameloblastoma was the most common tumour followed by adenomatoid odontogenic tumour. The most common age at occurrence was 2nd-4th decade.

Conclusion: Odontogenic lesions can be solid and cystic. Solid lesions can be benign or malignant. They may present as gingival swellings. Communication with clinician and radiologist is essential in proper identification of these lesions.

Key words- Odontogenic tumors, cysts. Benign, malignant,

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I. Introduction

Odontogenic tumors comprise a range of disorders of growth from malignant and benign neoplasms, to malformations of dental tissues of self-limited growth^{1,2,3}. They are principally jaw lesions but some may present as localized gingival swellings, so-called peripheral odontogenic tumors. OT are derived from ectomesenchymal and/or epithelial tissues that constitute the tooth-forming apparatus. Like normal odontogenesis, the odontogenic tumors represent inductive interactions between odontogenic ectomesenchyme and epithelium (1, 2). OT are basically divided into two primary categories; malignant and benign, but the etiology is unknown⁶. The classification of odontogenic tumors is essentially based on interactions between odontogenic ectomesenchyme and epithelium. This dynamic classification is constantly renewed with the addition of new entities. In the field of odontogenic tumors and cysts, this consensus work is critical given the reincorporation of odontogenic cysts, reclassified tumors, new entities, and current rapid rate of discovery of genetic and molecular alterations⁷. The 2017 edition, like earlier editions, mainly divided odontogenic tumors into two categories, based on biologic behavior as malignant and benign⁸. The 2017 edition includes a simpler format such as epithelial, mesenchymal (ectomesenchymal), and mixed odontogenic tumors.

The aim of the study is to analyze the histopathological spectrum of Odontogenic lesions from the biopsies received in the department of Pathology, Siddhartha Medical College, Vijayawada.

II. Objectives

- 1) To estimate the prevalence of Odontogenic lesions in the biopsies received in the department of Pathology, Siddhartha Medical College, Vijayawada.
- 2) To study the age, sex ratios among the affected group.
- 3) To study the etiopathogenesis and associated factors.
- 4) To study the histopathological spectrum of odontogenic lesions.

III. Materials And Methods

It was a prospective study conducted in the department of Pathology, Siddhartha Medical College, Vijayawada between January 2016 and December 2017. Sources of samples were from Government dental hospital, Vijayawada, Government General Hospital, Vijayawada & various other private dental hospitals in and around Vijayawada.

The samples included in the study were mainly in the form of excision biopsies mostly consisting of soft tissue; some biopsies included bony bits & cyst enucleations. Few specimens like hemimandibulectomy and hemimaxillectomy were also included in the study.

Clinical details including the patients` age, sex, site of the lesion were recorded. The duration of the lesion, radiological findings & per-operative findings were collected from all the cases. A separate pro forma was developed and used for collecting data related to the patient.

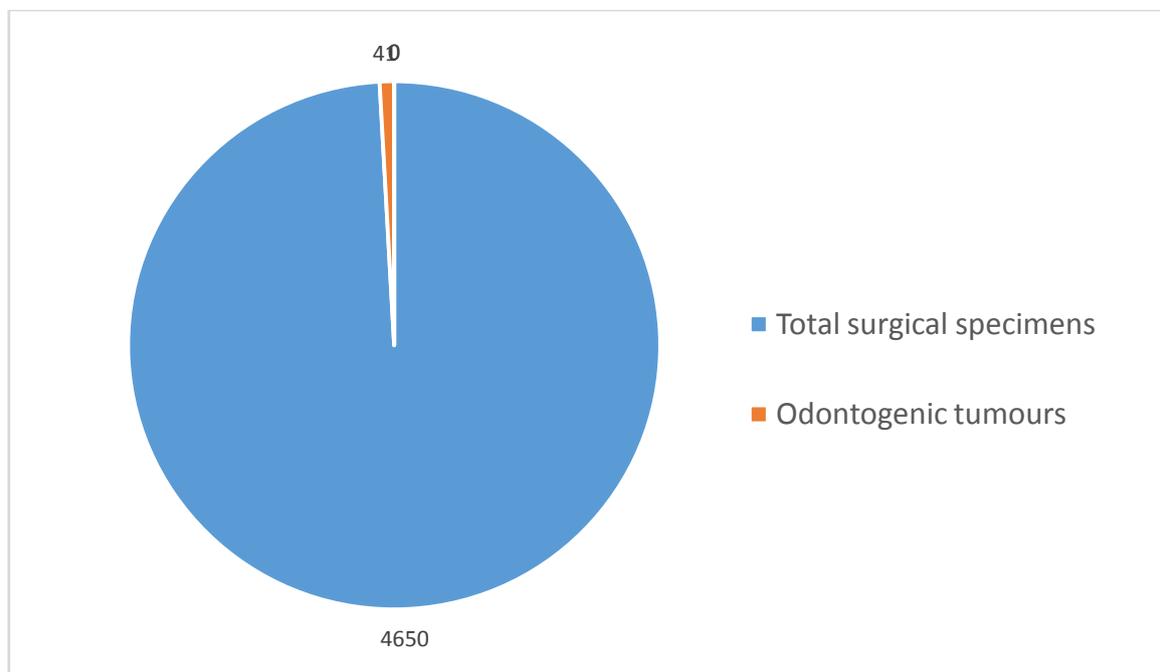
All the specimens were fixed in 10% neutral buffered formalin for 24 hours. Bony bits were subjected for decalcification by nitric acid. The tissues were processed in graded alcohols, cleared in xylene, impregnated with molten paraffin wax and finally embedded in paraffin wax.

The tissue blocks were submitted for section cutting with rotary microtome. The sections were cut with 6 microns thickness and fixed on the glass slides with egg albumin and subjected to H&E staining.

IV. Results

Total surgical specimens received by the department of Pathology, Siddhartha medical college, Vijayawada, were 4000. Out of the total 4000 surgical specimens received, the odontogenic tumours were 41, accounting for 0.9% of total surgical specimens.

Chart 1 – Incidence of Odontogenic tumours in present study

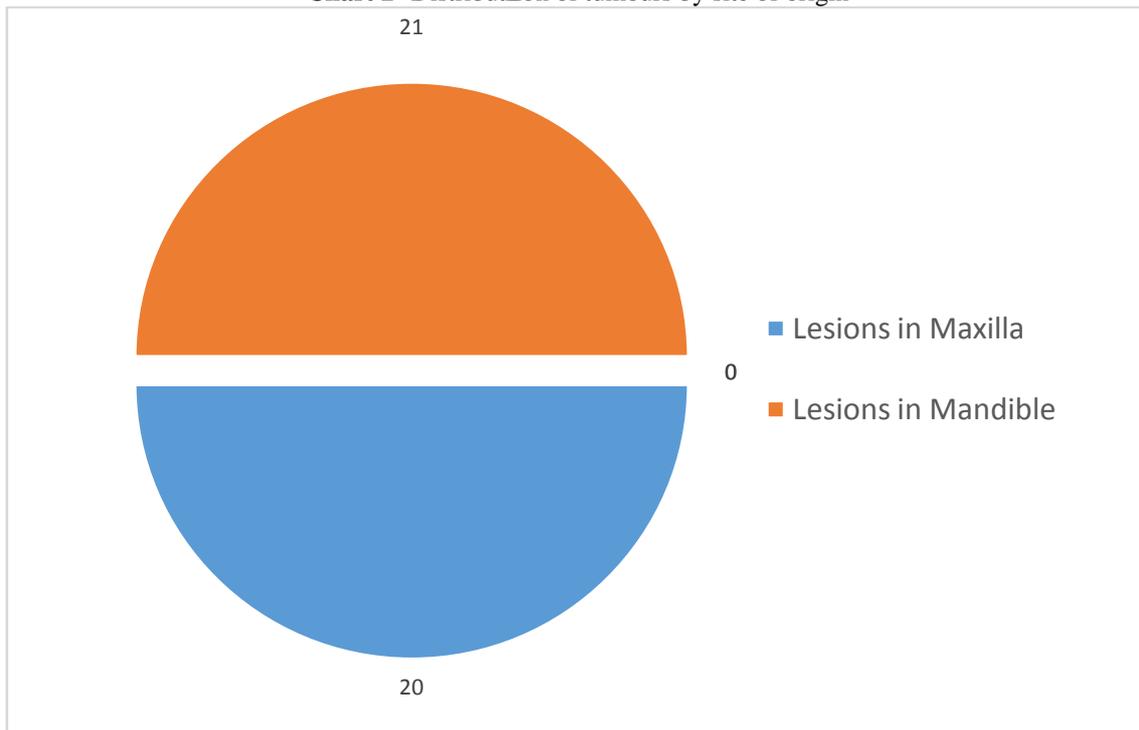


Among the 41 cases included in the present study, 21 lesions were observed in mandible and 20 lesions were observed in maxilla.

Table 1 - Distribution of Odontogenic tumours

Site of biopsy	No. of Cases	Percentage
Mandible	21	50.2
Maxilla	20	49.8

Chart 2- Distribution of tumours by site of origin



Out of the 41 cases included in this series, the commonest tumour is Ameloblastoma.

Table 2-Number of cases in present study and percentage

Type of tumour	No. of cases	Percentage
Ameloblastoma	12	29.3%
Adenomatoidodontogenictumour	2	4.9%
Calcifying epithelial Odontogenictumour	1	2.4%
Central Odontogenic fibroma	1	2.4%
Ameloblastic Fibroma	1	2.4%
Calcifying Odontogenic cyst	1	2.4%
Cementifying fibroma	2	4.9%
Ossifying fibroma	1	2.4%
Giant cell Granuloma	5	12.2%
Mucoepidermoid carcinoma	1	2.4%
Adenoid cystic carcinoma	1	2.4%
Dentigerous cyst	4	9.8%
Odontogenickeratocyst	3	7.3%
Periapical cyst	4	9.8%
Periodontal cyst	1	2.4%
Glandular odontogenic cyst	1	2.4%

tumor	Arotiba ²⁷ (Ibadan)	Mosadomi ²⁸ (Lagos)	Wu & Chan ²⁹ (HongKong)	Regezi ³⁰ (Michigan)	Gunhan ³² (Turkey)	Daley (Ontario)	Present study
Ameloblastoma	59	66	62	11	37	13	42.8
Adenomatoid	13	7	4	3	3	3	7.1
OdontogenicMyxoma	16	-	1	3	13	5	-
Ameloblastic fibroma	3	7	0	2	5	2	3.5
Ameloblasticfibrosarcoma	1	-	0	0	0	0	-
Calcifying epithelial cyst	2	3	2	2	1	4	3.5
Calcifying epithelial tumor	2	-	-	<1	2	1	3.5
Central odontogenic fibroma	2	-	4	0	5	5	3.5
Peripheral odontogenic fibroma	-	-	4	0	0	9	-
Ameloblasticfibroodontoma	1	-	1	2	1	3	-
Odontoma- compound	-	-	6	37	9	33	-
Complex	-	-	-	30	9	19	-
Periapicalcemental dysplasia	-	-	2	8	0	0	7.1

Cementoma	-	7	17	-	0	0	-
Number of cases	128	29	82	706	409	392	28

Chart 3- Prevalance of Odontogentumours in present study

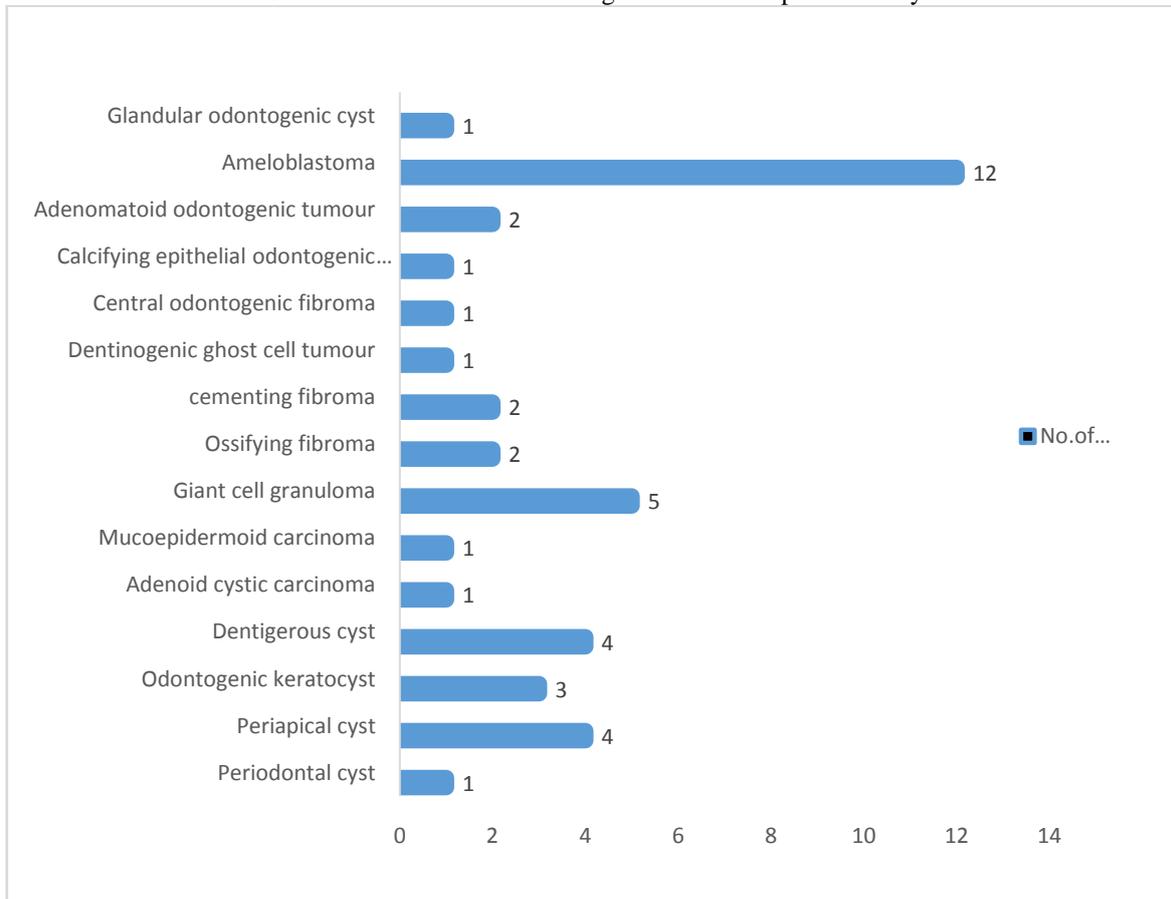


Table 3- Distribution of cases according to the age

Age in years	Number of cases
0-10	2
11-20	12
21-30	8
31-40	11
41-50	5
51-60	2
61-70	0
71-80	1

Chart 4- Age EZdistribution of cases

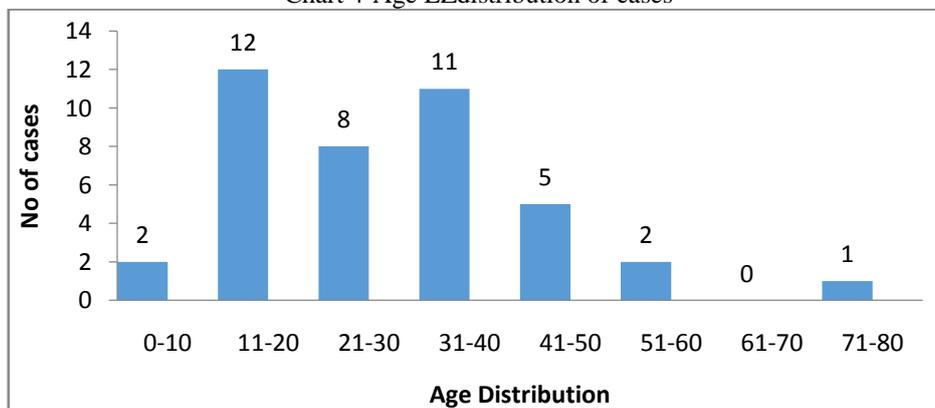


Table 4- Distribution of Odontogenictumours in male and female

Type of tumour	Male	Female	Total
Ameloblastoma	8	4	12
Adenomatoidodontogenictumour	1	1	2
Calcifying epithelial odontogenic	1	0	1
Central odontogenic fibroma	0	1	1
Ameloblastic fibroma	0	1	1
Calcifying odontogenic cyst	0	1	1
Cementing fibroma	2	0	2
Ossifying fibroma	0	1	1
Giant cell granuloma	3	2	5
Mucoepidermoid carcinoma	0	1	1
Adenoid cystic carcinoma	0	1	1
Dentigerous cyst	1	3	4
Odontogenickeratocyst	2	1	3
Periapical cyst	2	2	4
Periodontal cyst	1	0	1
Glandular odontogenic cyst	1	0	1
Total	22	19	41

Table 5- Distribution of Odontogenic cysts and tumours

Lesion	Number	Percentage
Odontogenic cysts	13	31.7%
Benign tumours	26	63.4%
Malignant tumours	2	4.9%
Total	41	100%

Chart 5 -Distribution of Odontogenic cysts and tumours

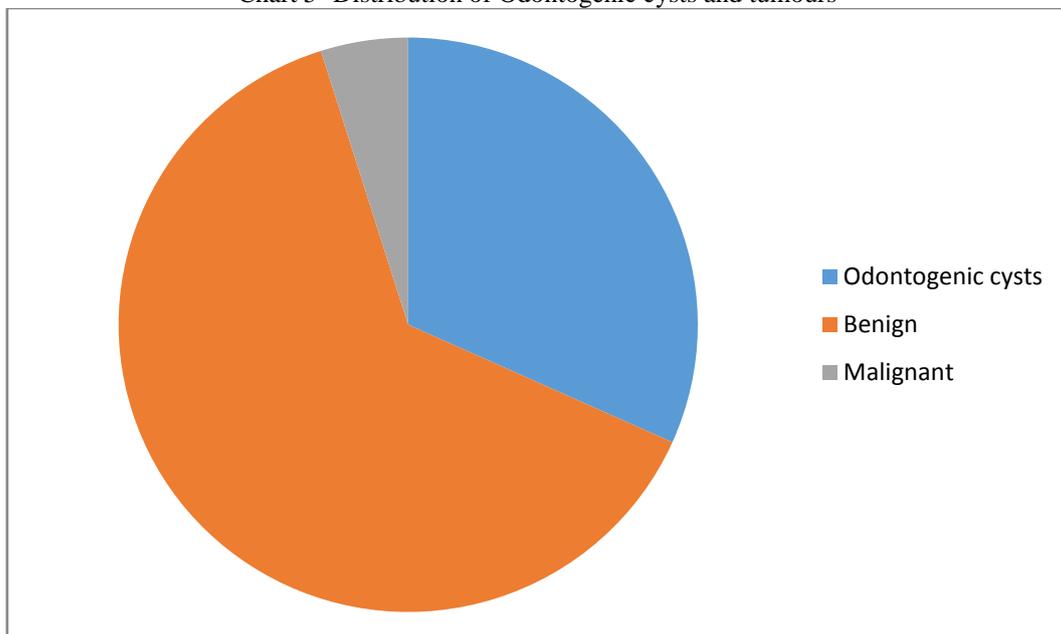


table 6 – Age and sex incidence among cases of Ameloblastoma

Age in Years	Number of cases	Male	Female
0-10	1	1	0
11-20	1	1	0
21-30	2	1	1
31-40	5	3	2
41-50	2	1	1
More than 50	1	1	0
Total	12	8	4

Table 7 - Variants of Ameloblastoma with male and female distribution

Variants of Ameloblastoma	Number of cases	Male	Female
Conventional ameloblastoma	10	7	2
Unicysticameloblastoma	1	1	1
Peripheral ameloblastoma	1	0	1
Total	12	8	4

Table 8- Histological patterns of Ameloblastoma

Histological pattern	Number of cases
Follicular	3
Plexiform	2
Follicular and Plexiform	1
Follicular and acanthomatous	1
Basal cell	1
Follicular with cystic change	1
Desmoplastic	1

Table 9- Radiological appearances of Odontogenictumours in this study

Type of tumour	Radiolucent	Radio opaque	mixed
Ameloblastoma	7	1	4
Adenomatoidodontogenictumour	1		1
Calcifying epithelial odontogenic	1		
Central Odontogenic fibroma	1		
Ameloblastic fibroma	1		
Calcifying odontogenic cyst	1		
Cementing fibroma		2	
Ossifying fibroma		1	
Giant cell granuloma	5		
Mucoepidermoid carcinoma			1
Adenoid cystic carcinoma		1	
Dentigerous cyst	3		
Odontogenickeratocyst	3		
Periapicalcysr	4		
Periodontal cyst	1		
Total	29	5	7

V. Discussion

The Odontogenic tumors were classified by the World Health Organization – 1992 on the basis of cystic and solid tissue⁴. The cysts were divided as developmental cysts and inflammatory cysts⁴. The solid tumors were divide on the basis of the cell of origin.(36book). They are tumors of Odontogenic epithelium without odontogenicectomesenchyme, with odontogenic ectomesenchyme⁷Some of the tumors like odontogenic fibroma central/peripheral, granular cell tumors and odontogenicmyxomas were originating from obscure cells where the ectomesenchyme origin could not be proved.

Steven G Silverberg³³ et al in their book titled “Principles and Practice of Surgical Pathology and Cytopathology” have divided the odontogenic lesions into two groups namely 1) Odontogenic cysts 2) Odontogenic tumors. They have further divided the tumour into benign and malignant and they divided the cysts into developmental and inflammatory.

They divided the benign odontogenic tumors on the basis of the cell of origin viz. epithelial, mesenchymal and mixed. They have designated odontogenic carcinoma , malignant meloblastoma, ameloblastic carcinoma and fibrosarcoma as malignant tumours.Elision N.M. Simon et al (16book) have published a prospective study of odontogenictumours and grouped them as solid and cystic.

Various authors have reported the incidence of odontogenictumours from 19%-30% among tumours of mouth and jaw—Adebayo et al – 32%, J.T.Ayotiba²⁷ et al – 30%, while present study has 28% of odontogenictumours.

About 351 and 176 cases occurred in maxilla and mandible respectively in study by V.Olgac²⁴ et al , 33 cases and 94 cases from maxilla and mandible respectively in study by J.T.Ayotiba²⁷ et al (31), while 20 cases in maxilla and 21 cases in mandible were observed in present study.

The odontogenic tumors occurred mostly in the age group of 2nd to 4th decade.

Table- Comparison of age distribution of odontogenictumours

Study group	0-10	11-20	21-30	31-40	41-50	51-60	67-70	71-80
Ellison N.M.Simon et al – 111 cases	2	23	35	26	16	9	-	-
V.Olgac et al – 527 cases	128		236		113		50	
J.T.Arotiba et al – 128 cases	7	32	36	21	13	8	8	3
Present study- 41 cases	2	12	8	11	5	2	1	-

While comparing the sex distribution among the cases of odontogenictumours, it was observed that the ratios of male vs. female were around 1:1.

Table – variation in sex distribution of odontogenictumours

Study group	Male	Female	Total	Ratio
V.Olgac et al	249	278	527	1:1.1
J.T.Arotiba et al	67	61	128	1.1:1
Simon et al	43	58	101	1:1.3
Present study	22	119	41	1.15:1

Ameloblastoma has been reported as the tumour with high incidence in various studies- Ayotiba²⁷- 59%(31book), Mosadomi-66%(47book), Wu-chan²⁹62%(83book).while present study has 42.8%.

Site of origin of ameloblastoma varied in various studies. In all studies including the present study the mandibular lesion predominantly seen when compared to maxillary region. and J.T.Arotiba²⁷ et al reported 91% of lesions in mandibular location. The present study has shown 3 of 4 cases in mandible.

Adenomatoidodontogenictumour was seen in 7% cases(2 caes). In the contemporary studies, Mosqueda²⁸ – taylor et al (49 book) has also observed similar prevalence. The other authors reported varied figures from 1.3% to 7.1%.

Odontogenic cysts

These are derived from a) Tooth germ b) Degenrated epithelium around the impacted or non-erupted tooth c) epithelial rests d) Remnants of dental lamina (

The present study has included four cysts. – dentigerouscyst,periapical cyst, periodontal cyst and odontogenickeratocyst.

Table - Cysts in present study

Cyst	No of cases		
	Total	M	F
Dentigerous cyst	4	1	3
Periapical cyst	4	2	2
Periodontal cyst	1	1	0
Odontogenickeratocyst	3	2	1

There was female preponderance in case of dentigerous cyst. The other cysts were seen mostly in males. The age at onset was 8,13,18,20 in case of dentigerous cyst. The periapical cysts were seen at the ages of 20,21,34 and 40. The periodontal cyst was seen in a patient with 46 years of age. Odontogenickeratocyst was seen at the ages of 20,21 and 25. The highest age was 45 years and lowest was 8 years.

The odontogenic cysts included in the present study were showing the classical microscopic appearances described in the contemporary literature.

VI. Conclusion

An attempt has been made in the present study to evaluate and correlate the clinical, and histopathological features of the odontogenic tumors. The histopathology was the main diagnostic tool in confirming the diagnosis. It needs a good coordination between a clinical, radiologist and pathologist for an early accurate diagnosis and to evaluate the prognostic factors. The sample sizes should be very large to pick up the variants.

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