International Journal of Pediatric Otorhinolaryngology 86 (2016) 196–199

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: www.elsevier.com/locate/ijporl

Odontogenic lesions in a pediatric population: Review of the literature and presentation of 745 cases

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ARTICLE INFO

Article history:
Received 20 March 2016
Received in revised form 4 May 2016
Accepted 8 May 2016
Available online 11 May 2016

Keywords:
Children
Odontogenic cysts
Odontogenic tumors
Pathology
Pediatric lesions

ABSTRACT

Objectives: Pediatric odontogenic lesions are rare clinical entities and are not well addressed in the otolaryngology literature. Knowledge of the biologic and clinical behavior of these lesions and their basic features such as location and age are key aspects for otolaryngologists in developing an early clinical differential diagnosis, such that they can provide adequate treatment.
Methods: Six thousand histologically-diagnosed odontogenic lesions from a 40-year period were reviewed. Pediatric patients (745 cases, 12.7%) aged up to 17 years were selected and reevaluated. The patients were divided into three age groups according to dentition periods: primary dentition (0–5 years), mixed dentition (6–12 years), and permanent dentition (13–17 years). Clinical data, including age, sex, and location, were collected from pathology records.
Results: Of the total of 745 cases, 596 specimens (80%) were diagnosed as odontogenic cysts and 149 specimens (20%) were diagnosed as odontogenic tumors. The most frequent odontogenic cysts were radicular cysts (48.4%), followed by dentigerous cysts (16.7%). The most common odontogenic tumor was odontoma (8.05%).
Conclusion: This study shows that all odontogenic lesions in the pediatric group are benign. Odontogenic tumors are relatively rare in this age group. Knowledge of the biological and histopathological behaviors of odontogenic lesions and their basic features such as location and age is a key aspect for developing an early clinical differential diagnosis and providing adequate treatment.

1. Introduction

Odontogenic tumors and odontogenic cysts represent an important aspect of oral and maxillofacial pathology. Odontogenic tumors are uncommon lesions, whereas odontogenic cysts are relatively common lesions in dental practice [1]. Odontogenic cysts arise in the epithelial component of the odontogenic apparatus or from its remnants, and are subclassified as developmental and inflammatory cysts. Developmental cysts are of an unknown origin but do not seem to be the result of an inflammatory reaction like inflammatory cysts [2].

Odontogenic tumors are derived from cells that specialize in odontogenesis and its products, including dentin, enamel, and cement. They are a complex group of lesions of diverse histopathological types and clinical behavior. Odontogenic tumors range from hamartomatous proliferations to malignant neoplasms [3].

There are relatively poor epidemiological data about oral and maxillofacial lesions in children, especially in the Turkish population. Only one large study in Turkey focused on all pediatric oral biopsies [4]. The aim of the present study was to draw the attention of otolarygologists to odontogenic lesions, which should be kept in mind during radiographic evaluation.

2. Patients and methods

2.1. Study population

Oral biopsy reports over a 40-year period were obtained from the files in our department. Patients with odontogenic lesions (odontogenic cysts and odontogenic tumors) with an age of 17 years and younger were selected. The patients were divided into three age groups according to dentition periods: primary dentition period (0–5 years), mixed dentition period (6–12 years), and permanent dentition period (13–17 years). Clinical data, including age, sex, and location were collected from pathology records.

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http://dx.doi.org/10.1016/j.ijporl.2016.05.010
0165-5876/

Table 1
The distribution of odontogenic cysts with respect to age, sex, and anatomic site in the pediatric patients.

Diagnosis	Number of cases	Age range (years)			M : F ratio	Maxilla anterior	Maxilla premolar	Maxilla molar	Mandible anterior	Mandible premolar	Mandible molar
		0–5	6–12	13–17							
Developmental cysts	195	3	96	96	1.11	18	33	20	17	21	86
Odontogenic keratocyst	64	0	20	44	0.07	7	5	9	8	5	30
Dentigerous cyst	128	3	75	50	0.17	11	27	11	7	16	56
Lateral periodontal cyst	1	0	0	1	0	0	0	0	1	0	0
Botryoid odontogenic cyst	1	0	0	1	∞	0	0	0	1	0	0
Eruption cyst	1	0	1	0	0	0	1	0	0	0	0
Inflammatory cysts	387	3	113	271	0.1	171	20	15	70	44	67
Radicular cyst	370	3	108	259	1	168	16	14	67	39	66
Residual cyst	17	0	5	12	0,7	3	4	1	3	5	1
Unclassified odontogenic cyst	14	0	5	9	2.5	3	0	1	3	3	4
Total	596	6	214	376	1.05	192	53	36	90	68	157
%	100%	1%	36%	63%		32.2%	9%	6.%	15.1%	11.4%	26.3%

2.2. Evaluation methods

Hematoxylin and eosin-stained slides were re-examined by two pathologists. With the exception of odontogenic keratocysts, odontogenic tumors and cysts were reevaluated in accordance with the 2005 World Health Organization (WHO) histological classification. Odontogenic keratocysts were reclassified in the 2005 WHO edition of the classification of Head and Neck Tumors and were moved from a cystic to a neoplastic lesion. In this study, for the sake of comparison, we evaluated this lesion as a developmental cyst.

All data analyses and graph formations were performed using Excel version 2007.

3. Results

A total of 42,296 oral biopsies from all age groups were examined from a 40-year period, 6000 (14.2%) of which were diagnosed as odontogenic lesions. Of the 6000 odontogenic lesions, 745 (12.4%) were in the pediatric population, 596 of which (80%) were diagnosed as odontogenic cysts and 149 specimens (20%) were diagnosed as odontogenic tumors. The majority of the odontogenic cysts and tumors were found in permanent dentition (63.1% and 63.1%, respectively). Of the total cases, 379 cases were male patients and 366 cases were female patients (M : F = 1.03:1).

Table 1 summarizes the age, sex, and site distribution of odontogenic cysts. The most common odontogenic cyst was radicular cyst, which accounted for 62.1% of all odontogenic cysts. The incidence of radicular cyst was found to be equal between the sexes (50%). Of the 370 cases, 198 were located in the maxilla and the anterior maxillary was the most commonly affected site. Radicular cysts were common in the permanent dentition group (70%).

The second most common cyst was dentigerous cyst with 128 cases (21.5%). The mandible was affected in 79 cases (61.7%), of which 56 cases (70.9%) occurred in the molar mandibular area. Most dentigerous cysts occurred in the mixed dentition group (58.6%).

The third most frequently diagnosed odontogenic cyst was odontogenic keratocyst, with 64 cases (10.73%) and a male : female ratio of 0.07:1. Of these cases, 30 were located in the mandibular molar area, which was the most frequently affected site. Odontogenic keratocysts were about twice as common in permanent dentition than in mixed dentition (44 cases and 20 cases, respectively).

Table 2 summarizes the age, sex, and anatomic site distribution of odontogenic tumors. In the tumor category, odontoma was the most common odontogenic tumor (60 cases: 33 complex, 27 compound). The majority of the lesions were found in the permanent dentition period (53.33%) with a male : female ratio of 1.85:1.

Ameloblastoma was the second most frequent odontogenic tumor with 33 cases (22.1%). The mandible was the most commonly affected site with 28 cases (85%), of which 21 cases (77.5%) occurred in the mandibular molar site. The tumor arose mainly in the permanent dentition period (80.6%).

The mandible was more commonly involved than the maxilla in all tumors (ratio 1.7:1) and this was particularly prominent for ameloblastomas and complex odontomas. Most of the cases of compound odontoma and odontogenic myxomas were found particularly in the maxillary anterior region. There were no malignant odontogenic tumors observed in the pediatric group.

The four most frequently diagnosed odontogenic lesions were radicular cysts (49.6%), dentigerous cysts (17.1%), odontogenic keratocysts (8.6%), and odontomas (8.05%).

Table 2
Age, sex and site distribution of 149 pediatric patients with odontogenic tumors.

Diagnosis	Number of cases	Age range (years)			M : F ratio	Maxilla anterior	Maxilla premolar	Maxilla molar	Mandible anterior	Mandible premolar	Mandible molar
		0–5	6–12	13–17							
Ameloblastoma	31	0	6	25	0.7	2	0	1	1	6	21
Adenomatoid odontogenic tumor	4	0	0	4	0	3	0	0	0	1	0
Odontoma complex	33	3	11	19	2.7	7	0	1	10	0	15
Odontoma compound	27	1	13	13	1.25	13	2	1	6	2	3
Cementoblastoma	4	0	2	2	0	0	2	0	1	0	1
Ameloblastic fibrodentinoma	6	0	2	4	0.5	2	0	0	0	0	4
Ameloblastic fibroma	7	0	2	5	1.3	0	0	0	1	1	5
Ameloblastic fibro-odontoma	5	1	3	1	1.5	1	0	2	0	0	2
Calcifying cystic odontogenic tumor	8	0	3	5	1	2	0	0	0	6	0
Odontogenic myxoma/myxofibroma	24	2	6	16	0.6	7	5	4	0	6	2
Total	149	7	48	94	0.9	37	9	9	19	22	53
%	100	4.7	32.2	63.1		24.8	6.05	6.05	12.8	14.8	35.5