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Variation of pediatric and adolescents head and neck pathology in the city of Jeddah: A retrospective analysis over 10 years

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Abstract This study was conducted to present a comprehensive view of the most common head and neck pathologies among the pediatric and adolescent population of the city of Jeddah, Saudi Arabia. Data were collected from the oral and maxillofacial surgery (OMFS) records at King Abdulaziz University Hospital and King Fahad Hospital Jeddah (KFHJ) from the period 1998 to 2009. All patients who were 18 years of age and younger were included in the study. Identified lesions were classified into four categories: cystic, neoplastic, vascular and fibro-osseous. Age and sex distribution of the lesions were also calculated. A total of 155 patients were included in this study. Of all the lesions, 143 (92.26%) were benign and 12 (7.74%) were malignant; 63 (40.65%) were cysts; 48 (30.97%) were neoplasms; 23 (14.84%) were vascular and 21 (13.55%) were

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fibro-osseous tumors. The most common lesions were hemangioma (20 cases; 12.9%) followed by retention cyst (19 cases; 12.26%) and dentigerous cyst (15 cases; 9.68%). The most common benign odontogenic neoplasm was odontoma (7 cases; 4.52%), of which central giant cell granuloma (6 cases; 3.87%) was the most frequent benign nonodontogenic tumor and lymphoma (6 cases; 3.87%) was the most common malignant one. Although this study might benefit clinicians in guiding them through differential diagnosis of pediatric and adolescent head and neck pathology in reference to their sex and age groups, governmental efforts are badly needed to establish a Saudi childhood pathology registry.

1. Introduction

Pathology is uncommon among the pediatric age group, yet according to Albright et al. (2002) and Smith et al. (1998), its incidence and prevalence has been increasing in recent years, and it remains a significant cause of morbidity and mortality in this population. A number of articles in the literature discuss pediatric head and neck pathology, for example, Albright et al. (2002), Arotiba (1996), Bhaskar (1963), Gosepath et al. (2007), Jones (1965), Rapidis et al. (1998), Sato et al. (1997), Sengupta et al. (2009), Smith et al. (1998), Sousa et al. (2002) and Qannam (2010). However, such data are not available in Saudi Arabia to support practitioners concerning the incidence and prevalence of these lesions.

In this retrospective survey, our objective is to present an overview of the epidemiology of adolescent and pediatric pathology of the head and neck region in terms of age and gender distribution of the most common lesions among this population in the city of Jeddah, Saudi Arabia.

All children admitted to the Department of Oral and Maxillofacial Surgery (OMFS) at King Fahad Hospital Jeddah (KFHJ) and King Abdulaziz University Hospital (KAUH) diagnosed with head and neck pathology were included in the study. Data analysis was directed to answer the following questions:

1. What are the most common pediatric head and neck lesions?
2. What are the age groups associated with the most common lesions?
3. Is there a male or female predominance among the cases?

Results of this study should be considered as a preliminary registry for Saudi head and neck pathology that will help governmental officials establish a Saudi registry for different diseases and help clinicians in their differential diagnosis.

2. Methodology

A retrospective chart review of the oral and maxillofacial surgery service in two medical centers in Jeddah (KAUH and KFHJ) was done between January 1998 and December 2009. Jeddah was chosen as it is the largest city in the Western province and the second largest city in the Kingdom of Saudi Arabia. Furthermore, KAUH and KFHJ are the main governmental medical centers available to the public, and almost all patients in the Western province are referred to these hospitals.

All patients 18 years old or less and diagnosed by the OMFS departments were involved in the study. However, patients over 18 years, cleft lip and palate patients and syndromic patients were excluded.

Based on these criteria, our database included 155 patients, ranging in age between 1 and 18 years (mean age 17 years, SD 4.44), including 86 girls and 69 boys. The patients were divided into four age groups: 0–5, 6–10, 11–15 and 16–18 years. The observed lesions were classified into four main categories: cystic lesions, fibro-osseous lesions, vascular lesions and neoplastic lesions.

3. Results

Among the 155 patients presenting with head and neck pathology, 21 patients (13.55%) were diagnosed with fibro-osseous lesions, 63 (40.65%) with cystic lesions, 23 (14.84%) with vascular lesions and 48 (30.97%) with neoplastic lesions. Of all the lesions, hemangioma (20 cases; 12.9%) was found to be the most common, followed by retention cyst (19 cases; 12.26%) and dentigerous cyst (15 cases; 9.68%). Of the fibro-osseous lesions, the most common was fibrous dysplasia (10 cases; 6.45%), followed by ossifying fibroma (7 cases; 4.52%).

Additionally, of the neoplasms, 36 lesions (75%) were benign tumors and 12 lesions (25%) were malignant. The percentages of odontogenic tumors and nonodontogenic tumors were 41.66% (15 cases) and 58.33% (21 cases), respectively. The most frequent odontogenic tumor was odontoma (7 cases; 4.52%), followed by ameloblastoma (5 cases; 3.23%). Giant cell granuloma (6 cases; 3.87%) was the most common benign nonodontogenic tumor. Among malignant neoplasms, lymphoma (6 cases; 3.87%) was the most frequent type of cancer, followed by fibrosarcoma (2 cases; 1.29%) and rhabdomyosarcoma (2 cases; 1.29%) (Table 1).

Regarding the age distribution of the four main categories of lesions, the highest percentage of cysts (46.03%) and neoplasms (39.58%) was evident between patients of 11 and 15 years. Whereas vascular and fibro-osseous lesions were diagnosed predominantly between 16 and 18 (Table 2).

All cases of odontoma fell into the age group 11–15 years. This group also was the most common for dentigerous cyst, fibrous dysplasia, giant cell granuloma and lymphoma. On the other hand, hemangioma, ossifying fibroma and ameloblastoma were found to be more common between 16 and 18, while retention cysts were predominant between 6 and 10 (Table 3).

Lesions appearing between the ages of 0 and 5 years were mostly cystic – mainly nonodontogenic cyst (83.33%; retention cyst, dermoid cyst); odontogenic cysts accounted for only

Table 1 Number and percent of the pediatric head and neck pathology in the city of Jeddah.

Pathologic condition	No. of cases	Percentage
Fibro-osseous lesions		
Fibrous displasia	10	6.45
Ossifying fibroma	7	4.52
Cemento ossifying fibroma	2	1.29
Osteoma	2	1.29
Cystic lesions		
Retention cyst	19	12.26
Dentigerous cyst	15	9.68
Residual cyst	3	1.94
Anurismal bone cyst	2	1.29
Dermoide cyst	2	1.29
Thyroglossal duct cyst	1	0.65
Branchial cyst	1	0.65
Radicular cyst	1	0.65
Other cyst[a]	19	12.26
Vascular lesions		
Hemangioma	20	12.9
Lymphangioma	2	1.29
Cystic hygroma	1	0.65
Neoplastic lesions		
Benign neoplastic lesions		
Odontoma	7	4.52
Giant cell granuloma	6	3.87
Ameloblastoma	5	3.23
Pyogenic granuloma	5	3.23
Neurofibroma	5	3.23
Lipoma	2	1.29
Ameloblastic fibroma	2	1.29
Fibroma	2	1.29
Myxoma	1	0.65
Eusinophilic granuloma	1	0.65
Malignant neoplastic lesions		
Lymphoma	6	3.87
Fibrosarcoma	2	1.29
Rhabdomyosarcoma	2	1.29
Owing's sarcoma	1	0.65
Fibromyosarcoma	1	0.65

[a] Other cysts include unspecified types of cysts found in the data, such as: maxillary cyst, mandibular cyst, and palatal cyst.

16.6% (1 case of residual cyst). Fibro-osseous and benign tumors were the second most frequently encountered lesions, but no malignancies were detected in this age group. Benign tumors and fibro-osseous lesions found in this age category included pyogenic granuloma, ameloblastic fibroma, central giant cell granuloma, ossifying fibroma and fibrous dysplasia.

As shown in Table 4, fibro-osseous, vascular and cystic lesions were recognized more often in girls, whereas lymphoma and ameloblastoma presented mostly in boys. In general, malignancies were more often seen above 10 years old, with maximum occurrence in the group between 16 and 18 (50%) followed by age groups 11–15 and 6–10 years, both with a frequency of 25%. On the other hand, odontoma was more prevalent in girls. As for the nonodontogenic tumors, central giant cell granuloma was the most common among females (Table 5).

4. Discussion

Although pediatric head and neck malignancies are not common (Sousa et al., 2002), 5% of all childhood cancers are head and neck malignancies, thereby affecting approximately 550 children every year (Smith et al., 1998). Data of this study showed that lymphoma was the most common malignant tumor (6 cases; 3.82%), followed by fibrosarcoma (3 cases; 1.91%) and rhabdomyosarcoma (2 cases; 1.27%). Lymphoma was seen more in boys, as expected (Gosepath et al., 2007).

Benign lesions were diagnosed more often than malignant ones in this series, and this is in agreement with the others (Sato et al., 1997; Tanaka et al., 1999; Al-Khateeb et al., 2003). Also, hemangioma was the most common soft tissue pathology, followed by retention cyst and dentigerous cyst, and this is consistent with other studies (Bhaskar, 1963; Jones, 1965; Kaban and Mulliken, 1986; Rapidis et al., 1998; Sato et al., 1997; Ulmansky et al., 1999).

Ulmansky et al. (1999) found that inflammatory lesions, cysts and congenital malformations accounted for 80% of the oral pathology, and this is in agreement with our results. Similar findings were reported by Sousa et al. (2002), who found that mucocele (13.5%) and dentigerous cyst (6.5%) were the most common lesions in pediatric patients; Wang et al. (2009) also reported that retention cysts and dentigerous cysts were the most common cystic lesions in the pediatric population.

The findings that odontoma (followed by ameloblastoma) is the commonest odontogenic tumor are in agreement with Adeyemi et al. (2008), Jones (1965), Sato et al. (1997), Ulmansky et al. (1999) and Wang et al. (2009). However, Arotiba (1996) reported that ameloblastoma is the most common odontogenic tumor in Nigerian children. This may be attributed to differences in population, geography, environment and genetics.

In a previous work (Al Yamani, 2005), our first author found that the most common odontogenic tumors were ameloblastoma, followed by odontoma. It is important to elaborate

Table 2 Age distribution of the four main categories.

Pathology	0–5		6–10		11–15		16–18	
	No.	%	No.	%	No.	%	No.	%
Fibro-osseous lesions	3	14.29	2	9.52	7	33.33	9	42.86
Cystic lesions	6	9.52	19	30.16	29	46.03	9	14.29
Vascular lesions	2	8.7	6	26.09	5	21.74	10	43.48
Neoplastic	4	8.33	9	18.75	19	39.58	16	33.33
Benign	4	11.11	6	16.66	16	44.44	10	27.77
Malignant	0	0	3	25	3	25	6	50

Table 3 Age distribution of the most common pathology.

Pathology	Age group			
	0–5	6–10	11–15	16–18
Ossifying fibroma	2	1	0	4
Fibrous displasia	1	1	6	2
Retention cyst	3	9	5	2
Dentigerous cyst	0	3	12	0
Hemangioma	0	5	5	10
Odontoma	0	0	7	0
Ameloblastoma	0	0	1	4
Giant cell granuloma	1	0	4	1
Lymphoma	0	2	3	1

Table 4 Sex distribution of the four main pathology categories.

Pathology	Total	Male	Male (%)	Female	Female (%)
Fibro-osseous	21	8	38.09	13	61.9
Cystic	63	29	46.03	34	53.96
Vascular	23	7	30.43	16	69.56
Neoplastic	48	25	52.08	23	47.91
Benign neoplastic	36	19	52.77	17	47.22
Malignant neoplastic	12	6	50	6	50

Table 5 Sex distribution of the most common lesions.

Pathology	Total	Male	Female
Ossifying fibroma	7	3	4
Fibrous displasia	10	3	7
Retention cyst	19	9	10
Dentigerous cyst	15	9	6
Hemangioma	20	5	15
Odontoma	7	2	5
Ameloblastoma	5	3	2
Giant cell granuloma	6	2	4
Lymphoma	6	4	2

on the age of the sample. His sample included patients aged 1–30. Moreover, if we calculate the most common odontogenic tumors in the pediatric and adolescent population of his sample, odontoma comes first.

The fact that malignancies were not found in patients under the age of 5 years is supported by others, as Sengupta et al. (2009), Gosepath et al. (2007) and Albright et al. (2002) reported that cancer was diagnosed predominantly above 5 years of age.

It is well known that ameloblastoma presents during middle age (25–40 years) in the mandibular premolar–molar area. The findings of our study contradict this fact, as five patients presented with ameloblastoma as early as 11 and 18 years of age, and the mean age of presentation was 16.2 (SD 2.49).

The age incidence for various lesions found in this study agreed with those of other studies such as Sengupta et al. (2009) and Al-Khateeb et al. (2003).

In conclusion, this paper should be a revelation to the public health community in Saudi Arabia. Moreover, it could be the base of a National Saudi registry for pediatric head and neck pathology that would provide the government with more representative and reliable data that are now available within the Saudi community.

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