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Original Article

Clinico-Pathogenic Pattern of Maxillofacial Cysts – A Dental Health Issue

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ABSTRACT

Maxillofacial cysts occur frequently and affect dental health. Though majority are asymptomatic, however they can result in disfigurement and affect dental health. Their frequency and clinical characteristics in the local context need to be addressed. **Objective:** To determine the frequency and clinical characteristics of maxillofacial cysts. **Methods:** A descriptive retrospective chart review of patients with maxillofacial cysts was conducted at Department of Otorhinolaryngology, Capital Hospital PGMI Islamabad. N= 58 cases of both genders and any age with maxillofacial cysts, who were diagnosed and operated from 1st January 2017 to 31st December, 2018 were studied. Age, gender, clinical features, surgical procedure performed and histological diagnosis were recorded. Data collected were analyzed using SPSS-23.0. **Results:** Study population revealed a mean age of 28.59+12.37 years and a male: female ratio of 1: 2.22. Dental abscesses were most common (14, 24.1%); followed by mucous retention (12, 20.7%); mucocoele (10, 17.2%); naso-alveolar and dental cysts 8 (13.8%) each; radicular, dentigerous and epidermal inclusion cyst 2 (3.4%) each. The commonest presentation was swelling [46(79.31%)] with right cheek [18(31%)] and left cheek [16(27.6%)] being commonest locations. Denker's approach was adopted for 6 (10.3%) cases all being naso-alveolar cysts. Caldwell Luc's approach was adopted for mucocoeles, dental cysts and all the cases of radicular and dentigerous cysts. **Conclusions:** Maxillofacial cysts are not uncommon, with dental cysts being the commonest cysts of odontogenic origin, mucocoele being commonest cyst of maxillary origin, naso-alveolar cysts arising from the nasolacrimal apparatus and dental abscess being commonest infective pathology.

INTRODUCTION

Cysts are common occurrence and a large variety occur in the maxillofacial region. The prevalence of maxillofacial cysts is around 3.5%, with majority being odontogenic cysts [1]. These cysts can affect dental health to the extent of loss of teeth, and bone destruction [2]. Maxillofacial cysts are classified according to world health organization into epithelial cysts including Odontogenic and non-odontogenic cysts and non-epithelial cysts including traumatic, aneurysmal bone and Stafne's bone cysts [3]. Non-odontogenic cysts include nasolabial and nasopalatine cysts. Odontogenic cysts include developmental and inflammatory categories with Radicular, residual and paradental cysts included in inflammatory category, while gingival, primordial, follicular, eruption, lateral periodontal and odontogenic glandular cyst included in developmental cysts. Dentigerous cyst also being developmental cyst [3, 4]. Hence, the basic etiology is Inflammatory and developmental. Developmental cysts originate from epithelial rests trapped within the bones and gingiva and may originate from epithelial rests of Malasezz, dental lamina and enamel organ while the inflammation occurring at the roots of carious lesions and non-vital teeth result in inflammatory cysts [5]. In spite of origin from different tissues, these cysts may not show distinct clinical presentation [6] and majority may be asymptomatic with

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local swelling being commonest presentation followed by dental irregularities in children [1]. Imaging studies are essential in the work-up of maxillofacial cysts including orthopentomograms and computed tomography (CT) scans. Imaging especially CT Scanning is recommended to see expansion and association to neighboring structures and essential for surgical planning [7, 8]. MR imaging can further help in diagnosis of unilocular lesions which are difficult to diagnose radiologically [9]. With surgical exenteration and marsupialization being mainstay of treatment, histopathological evaluation to establish final diagnosis [10] and regular postoperative follow-up is essential [8]. However, in some, clinical, radiological and histopathological findings need to be correlated to reach the correct diagnosis [11]. Cystic ameloblastoma, dentigerous cysts and keratocystic tumor of odontogenic origin may appear identical with radiolucent lesions on radiography, but have characteristic histological features, however some lesions may have similar histological features and are diagnosed on radiography [11].

This study was conducted at an otolaryngology department of a tertiary care hospital where the objectives of the study was to determine the frequency and clinical characteristics of different maxillofacial cysts. This study will give a better understanding of maxillofacial cysts in our setup and thus help improve dental health.

METHODS

In this descriptive retrospective study, our study population comprised of 58 diagnosed cases of odontogenic and non-odontogenic maxillofacial cysts, who presented in the department of Otorhinolaryngology, Capital Hospital, Islamabad, Pakistan over a period of 2 years from 1st January 2017 to 31st December 2018. Study was conducted after obtaining ethical approval of research from the Hospital Ethics Committee vide Reg # 2020-01-003. Sample included both gender of any age, who presented in otolaryngology outpatients and were, diagnosed and operated under general anesthesia at our department. Patients with malignancies and those who had undergone surgical intervention before presenting to us were excluded from the study. The surgical case records of patients were reviewed to obtain basic demographic, history and other clinical data including age, gender, clinical features and surgical procedure performed and histopathology which was confirmed by histopathology reports of the patients. Data collected were analyzed using SPSS version-23.0. Descriptive statistics were used and Chi-Square was used to see associations. P-value of <0.05 was considered significant. Variables especially studied included age, gender, clinical features, surgical approach/ procedure and histologic diagnosis. Observations were made and compared with literature and discussed.

RESULTS

Current study population comprised of N=58 cases of cystic swellings of maxillofacial area. Patients mean age was 28.59+12.37 years with an age range of 7 to 64 years. Gender distribution showed a female preponderance with a male to female ratio of M:F = 1:2.22. The majority 46(79.31%) of the population was above 18 years of age (table 1). The commonest presentation was swelling in 46 (79.31%) cases while 12 (20.69%) presented with swelling and pain (table 1). These 12 cases were diagnosed as Dental cysts (4) and Dental Abscess (8).

Table 1: Frequency of Demographic and Clinical Features * Diagnosis. Cross Tabulation (N=58)

Demographic and Clinical Variables		Diagnosis								Total N (%)
		Naso-alveolar Cyst	Mucocoele	Mucous Retention Cyst	Dental Cyst	Dental Abscess	Radicular Cyst	Dentigerous Cyst	Epidermal Inclusion Cyst	
Age Group (Years)	<12	0	0	0	0	8	0	0	0	8 (13.8)
	13-18	2	0	0	0	2	0	0	0	4 (6.9)
	>18	6	10	12	8	4	2	2	2	46 (79.3)
Gender	Male	2	4	4	2	6	0	0	0	18 (31)
	Female	6	6	8	6	8	2	2	2	40 (69)
Complaints	Swelling	8	10	12	4	6	2	2	2	46 (79.31)
	Swelling and Pain	0	0	0	4	8	0	0	0	12 (20.69)
Location	Nose	2	0	0	0	0	0	0	0	2 (3.4)
	Left Cheek	0	4	8	0	2	2	0	0	16 (27.6)
	Right Cheek	2	6	4	4	0	0	0	2	18 (31)
	Left Alveolus	0	0	0	2	0	0	0	0	2 (3.4)
	Right Alveolus	0	0	0	2	0	0	0	0	2 (3.4)
	Sub-labial	0	0	0	0	8	0	0	0	8 (13.8)
	Left Cheek + Nose	4	0	0	0	0	0	0	0	4 (6.9)
	Right Cheek + Nose	0	0	0	0	0	0	2	0	2 (3.4)
	Gum	0	0	0	0	4	0	0	0	4 (6.9)

Figure 1 depicts the frequencies of the different variety of cystic swellings in the maxillofacial area noted in the study. Dental abscesses were the most common cystic swellings 14 (24.1%), followed by mucous retention cyst 12 (20.7%), mucocoele 10 (17.2%), naso-alveolar cysts and dental cysts were 8 (13.8%) each, redicular, dentigerous and epidermal inclusion cyst were 2 (3.4%) each.

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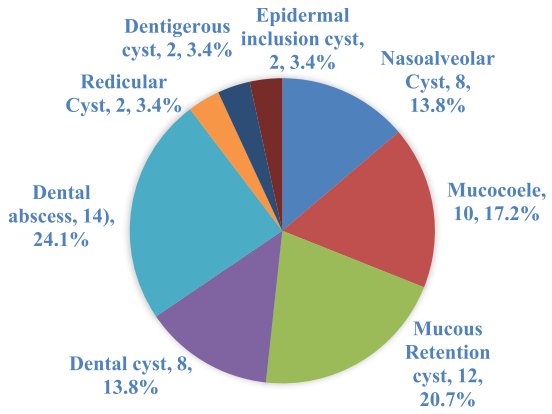

Figure 1: Frequency of Maxillofacial cysts (N=58)

Right cheek 18 (31%) and left cheek 16 (27.6%) were the commonest location followed by sub-labial 8 (13.8%). Naso-alveolar cysts presented with swelling involving left cheek and nose (4) (figure 2 a, b, c), Nose (2) (figure 2 d, e, f) and right cheek (2). Dental abscesses presented with swelling in the sub-labial location (8) (figure 1 i) and left cheek (2). Dentigerous cysts (2) presented with large swelling in the right cheek and nose (figure 2 g, h).

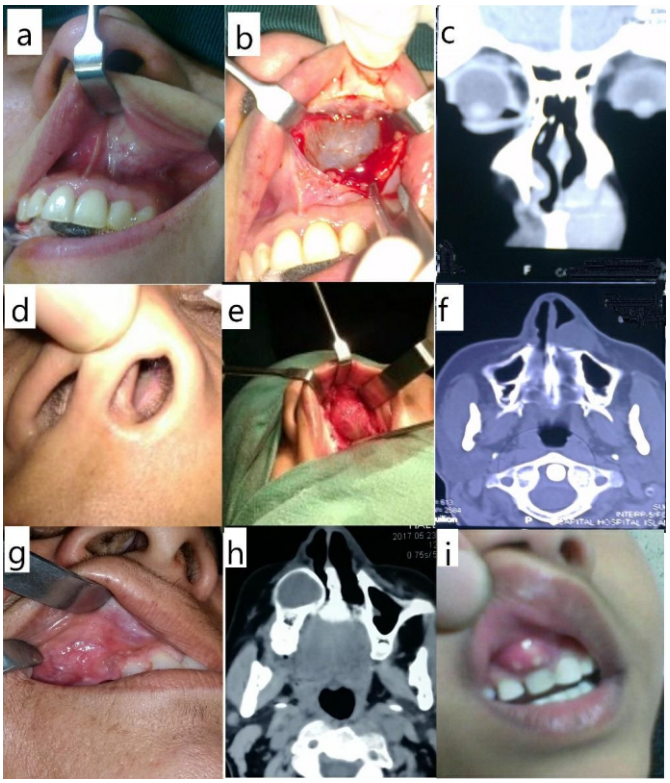

Figure 2: Photograph showing Case 1 with a) & b) Per-operative naso-alveolar cyst sub-labial approach, c) CT Scan PNS coronal view showing cystic lesion in nasoalveolar area; Case 2 with d) preoperative picture of nasoalveolar cyst, e) peroperative sublabial approach, f) CT Scan PNS coronal view showing cystic lesion at nasoalveolar area; Case 3) preoperative picture of dentigerous cyst and h) showing CT Scan showing dentigerous cyst on left side; Case 4 i) showing dental abscess pre-operative picture

As regards surgical approach/ procedure performed for different types of cysts (table 2), Denker's approach was adopted for 6 (10.3%) cases all being naso-alveolar cysts. Cald Wel Luc's approach had to be adopted for mucoceles, dental cysts and all the cases of redicular cysts and dentigerous cysts.

Table 2: Diagnosis * Surgical Approach/ Procedure. Cross Tabulation (N=58)

Diagnosis	Surgical Approach / Procedure				
	Denker	CWL	Sub-Labial	I & D	Tooth Extraction
	6 (10.3%)	16 (27.6%)	22 (37.9%)	12 (20.7%)	2(3.4%)
Naso-Alveolar Cyst	6	0	2	0	0
Mucocoele	0	8	2	0	0
Mucous Retention Cyst	0	0	12	0	0
Dental Cyst	0	4	4	0	0
Dental Abscess	0	0	0	12	2
Radicular Cyst	0	2	0	0	0
Dentigerous Cyst	0	2	0	0	0
Epidermal Inclusion Cyst	0	0	2	0	0

DISCUSSION

In the present study, Dental abscesses were the most common cystic swellings 14 (24.1%), followed by mucous retention cyst 12 (20.7%), mucocoele 10 (17.2%), naso-alveolar cysts and dental cysts 8 (13.8%) each. Redicular, dentigerous and epidermal inclusion cyst were least common with a frequency of 2 (3.4%) each. In contrast, in a local study by Awan *et al.*, conducted in 2007 and reported in 2017, the commonest cysts of odontogenic origin were radicular cyst (58%) followed by detigerous cyst (25%), keratocysts of odontogenic origin (15%), calcifying odontogenic cysts of epithelial origin (1%) and eruption cysts (1%) [12]. Also, in a Karachi-based study by Akram *et al.*, reported Radiocular cysts with frequency of 53% were commonest followed keratocystic tumors of odontogenic origin (27%) [13]. Nasolabial are extremely rare and have incidence of 0 .7% [5]. According to Tkaczuk *et al.*, reported keratocystic odontogenic tumors in 19 cases and dentigerous cysts in 17 cases to be most common pathologies in children [14]. Radicular cysts were most prevalent (48.67%) followed by dentierous cyst, keratoccyst of odontogenic origin, lateral periodontal cyst, para dental cyst, residual cyst, gingival cyst in adults, glandular odontogenic cyst, calcifying odontogenic cyst [15]. Radicular cysts were also most common (68.5%) followed by keratocysts of odontogenic origin 31.5% [16]. In a Turkish study majority of cysts (98.5%) were odontogenic while 1.5% were non odontogenic origin, with most common odontogenic cysts being radicular in 54.7%, followed by 26.6% dentigerous cysts, 13.7% residual cysts, 3.35 odontogenic keratocyst, 0.2% lateral periodontal cysts, whereas, nasopalatine duct cysts were the only non-

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odontogenic cysts [1]. In another study by Ali *et al.*, most prevalent cysts 63% was odontogenic cyst was radicular cyst and this was followed by dentigerous (22%) and keratocyst of odontogenic origin (14%) [15]. Current study revealed a gender distribution ratio of M: F = 1: 2.22 with 18 (31%) males and 40 (69%) females. However, in contrast most studies claim male gender to be implicated in most cases 1 with a frequency of 53% reported by Akram *et al.*, [13] and 58% by Kambalimath *et al* [17]. Current study sample revealed a mean age of 28.59+12.37 with an age range of 7 to 64 years with majority of the population 46 (79.31%) being above 18 years of age. Similarly, most studies reported a higher age with Kambalimath *et al.*, reported mean age of 32.2 years [17] and Açikgöz *et al.*, reported a peak in 3rd decade [1], while majority of dentigerous cysts were seen in patients in their second decade [18]. Anterior part of maxilla is the most prevalent site (44%) followed by posterior mandible (30%) [16]. In the present study, right cheek with a frequency of 18 (31%) and left cheek 16 (27.6%) were the commonest sites followed by sub-labial 8 (13.8%) presentation. Naso-alveolar cysts presented with swelling involving left cheek and nose (n=4) (figure 1 a,b,c), Nose (n=2) (figure 1 d,e,f) and right cheek (n=2). Dental abscesses presented with swelling in the sub-labial location (n=8) (figure 1i) and left cheek (n=2). Dentigerous cysts (n=2) presented with large swelling in the right cheek and nose (figure 1 g, h) with involvement of teeth. Also, according to Zerrin *et al.*, 33% of Detigerous cysts occur in the maxilla with displacement of involved or adjacent tooth in majority [7], especially in the canine area of maxilla [19]. Rarely cysts may cross the maxillary midline (19). In our study, 4 naso-alveolar cysts crossed midline and Denker's approach had to be adopted probable reason may be that these cysts are located para-median to wing of the nose along the naso-alar area [6] and easily cross midline when enlarge. A massive radicular cyst has been reported to cross midline [20], however this is not the case in our study. Inflammatory cysts like radicular cyst are commonly associated with necrotic pulp of a tooth [6]. Pulp necrosis and Malassez rest cells proliferation, which has been noted with low concentration of tumor necrosis factor is an event in radicular cyst Pathogenesis [21]. Though most developmental cysts are asymptomatic with 39% dentigerous cysts being symptomatic with swelling, pain and discharge in one study [7]. Also, Odontogenic keratocysts show latent periods, rapid growth spurts and may achieve large size being symptomless [22]. Since our cases presented late, the commonest presentation was swelling in 46 (79.31%) cases while 12 (20.69%) presented with swelling and pain. These 12 cases were diagnosed as Dental cysts (4) and Dental Abscesses (8). In the present study, as regards surgical approach/ procedure performed for different types of cysts with Denker's approach was adopted for 6 (10.3%) cases all being naso-alveolar cysts. Caldwell Luc's approach had to be adopted for mucocoeles, dental cysts and all the cases of radicular cysts and dentigerous cysts. Whatever the procedure, enucleation was done in all adults and same has been recommended for radicular cysts [20] and removal of involved tooth and curettage of neighboring tissue in some conditions like dentigerous cyst [11]. Though for cysts in maxillary sinus or extending to maxillary sinus, trans-nasal endoscopic surgery has been regarded as highly effective [23], however our approach was CWL clearance with good results. Decompression of odontogenic cysts has been advocated on children [24]. However, due to the tendency to recur, with odontogenic keratocysts, there is lack of consensus on ideal surgical procedure [22].

CONCLUSIONS

The study showed a moderate positive correlation between SMA and depression. Therefore, there is need of targeted interventions like educational seminars and other sessions to prevent the nursing students from addiction of social media and subsequently from depression.

Authors Contribution

Conceptualization: SZ, JK
Methodology: JK
Formal analysis: JK, AB, SH, SS
Writing-review and editing: MA, SS, S, SW, AURY

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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