Original article

Spectrum of biopsied oral and maxillofacial lesions in a tertiary care hospital of Karachi, Pakistan

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ABSTRACT

Objectives: The burden of benign and malignant maxillofacial lesions in developing countries has increased rapidly over the years. Objective of this study was to provide a spectrum of oral and maxillofacial lesions biopsied in a tertiary care hospital of Karachi, Pakistan and to contribute in baseline data of target population.

Patients and methods: This descriptive cross sectional study was made of biopsies performed in patients presenting to OPD of Oral and Maxillofacial Surgery Department, Abbasi Shaheed Hospital Karachi, Pakistan, between July 2018 till June 2020. A total of 652 patients belonging to either gender, 18-75 years of age, incisional or excisional biopsy were included. Recurrent or previously diagnosed lesions and patients not willing to give informed consent were excluded. Data including age, gender, site and histopathological diagnosis was recorded on a performa. Descriptive statistical analysis was done using SPSS version 26.

Result: Out of 652 biopsies performed, (82.9%, n=541) belonged to soft tissues and (17.1%, n=111) were hard tissue lesions. The mean age of patients was 41.82 years, with a male to female ratio of 2.9:1**.** The most frequent sites biopsied were buccal mucosa (50.9%, n=332) and posterior mandible (10.6%, n=69). Oral squamous cell carcinoma (OSCC) (55.1%, n=359) was the most commonly reported soft tissue lesion with major involved sites buccal mucosa (74.4%, n=267), dentoalveolar mucosa (8%, n=29) and lateral border of tongue (7.2%, n=26) and for hard tissue the most common lesion was ameloblastoma of posterior mandible (3.5%, n=23).

Conclusion: This study provides useful information about distribution of oral and maxillofacial lesions and highlights OSCC as the single most frequent diagnosis involving a much younger male population.

Keywords

Biopsy, Maxillofacial lesions, Oral Squamous Cell Carcinoma, Tertiary care hospital

INTRODUCTION

A wide variety of lesions can develop in the oral and maxillofacial region, with diverse origins and heterogeneous characteristics, including both benign and malignant lesions. Performing a biopsy is one of the most important investigations in oral surgery. A biopsy shows the morphological characterization of the tissue and is considered to be the gold standard for obtaining a definitive diagnosis for many lesions.[1] Although oral surgeons are very well versed in diagnosis of oral lesions but at times diagnosing a lesion can be challenging.[2] Therefore, literature about prevalence of oral and maxillofacial lesions not only increases awareness of disease patterns within populations, but highlights the lesions that are most likely to be encountered in daily practice. Worldwide there have been few histological-based studies of oral and maxillofacial lesions that include a comprehensive spectrum both of oral lesions and patients of all ages.[3] Majority of the published articles are designed to analyze only a specific lesion or disease, and limited to a certain age group or based on screenings or clinical surveys, without histological diagnostic confirmation.[4-7] A 20-fold global variation in the incidence of these lesions is apparent in international databases.[8] Two-thirds of the burden is within the developing world, where under-ascertainment of cases is significant.[9] One previous study from Karachi reported 75% of oral and maxillofacial lesions as neoplastic and 25% non-neoplastic, with granuloma pyogenicum as commonest non neoplastic lesion (37.5%) and squamous cell carcinoma being commonest malignant neoplastic lesion (80%).[10] The incidence of Oral Squamous Cell Carcinoma (OSCC) in Karachi is the highest reported worldwide.[11] To enhance the quality of care provided it is also important to develop a pathology database at a single center as well as nation-wide of commonly occurring oral lesions in order to produce skilled and knowledgeable surgeons that can easily provide treatment of lesions considered rare according to international data. The aim of this study is to determine

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Table 1. Anatomical site distribution of lesions percentages calculated out of a total 652 for both soft and hard tissues

Anatomical Site of lesion	Number of cases (*n*)	Percentage (%)	Type of lesion	
			Benign (*n*)	Malignant (*n*)
Soft tissue	**541**	**82.9**	**178**	**363**
Buccal mucosa	332	50.9	63	269
Mn dentoalveolar mucosa	48	7.4	32	16
Mx dentoalveolar mucosa	25	3.9	12	13
Palatal mucosa	11	1.7	7	4
Retro molar trigone	20	3	8	12
Tongue	30	4.6	1	29
Floor of mouth	5	.8	4	1
Lower lip	38	5.8	26	12
Upper lip	5	.8	3	2
Parotid gland	10	1.6	7	3
Submandibular gland	4	.7	3	1
Minor glands (palatal mucosa)	1	.2	0	1
Cheek	11	1.7	11	0
Forehead	1	.2	1	0
Hard tissue	**111**	**17.1**	**110**	**1**
Anterior mandible	14	2.2	14	0
Posterior mandible	69	10.6	68	1
Anterior maxilla	18	2.8	18	0
Posterior maxilla	10	1.5	10	0
Total	**652**	**100**	**288**	**364**

the frequency of biopsied oral and maxillofacial lesions, in population of a tertiary care hospital of Karachi Pakistan. The study will provide an important baseline data helpful in further management of lesions and for teaching purposes regarding the distribution of histologically diagnosed oral and maxillofacial lesions in target population.

PATIENTS AND METHODS

This descriptive cross-sectional study was carried out in a prospective manner for biopsies performed in patients presenting to Department of Oral and Maxillofacial Surgery Abbasi Shaheed Hospital / Karachi Medical and Dental College, Karachi Pakistan, between July 2018 till June 2020. During this period a total of 652 biopsies were performed. Inclusion criteria comprised of patients of either gender, aged 18 to 65 years, persistent lesion that cannot be clinically diagnosed, lesions with no identifiable cause that persist for more than 14 days despite local therapy and any lesion felt to have premalignant or malignant potential. Previously diagnosed or recurrent lesions and patients not willing to give informed consent were excluded from the study. Anterior maxilla is the part of maxilla extending from central incisor to canine region. Posterior Maxilla is part of maxilla extending from first premolar to maxillary tuberosity. Anterior mandible is the part of mandible extending from central incisor to canine region and posterior mandible is the part of mandible extending from first premolar upto condyle and coronoid process. Approval of the institutional ethical review committee was obtained. Incisional or excisional biopsy of the lesions under local or general anesthesia were performed by consultants and post graduate trainees for patients presenting at the Outpatient Department of Oral & Maxillofacial Surgery, Abbasi Shaheed Hospital / Karachi Medical and Dental College Karachi. The main presenting complaints were pain, swelling, ulcer, nodular growth and mobility of teeth. Informed consent was taken from each patient. Postoperatively patients were either admitted to ward or observed in OPD. Excised specimens were stored in biopsy bottle with 10% formalin and sent to laboratory with detailed history sheet for histopathological examination. Data including age, gender, anatomical site and histopathological diagnosis were recorded on a Performa. The descriptive statistical analysis of data obtained was performed to calculate frequency, percentages, means and cross tabulation between variables using SPSS version 26. The clinic-pathological parameters i.e. histopathological diagnoses and anatomical site were compared for both genders using Chi square test. A p-value <0.05 was considered as statistically significant.

RESULTS

A total of 652 biopsies were performed. The mean age of patients was 41.8 years $\pm$15.7, (range 18-75 years). In this study there was a marked male predominance (74.2%, n= 484) versus female (25.8 %, n=168). The male to female ratio was 2.9:1.Total (82.9%, n=541) of the biopsies corresponded to soft tissues whereas (17.1%, n=111) were from hard tissues. The most

Table 2. Distribution of soft tissue lesions according to number, percentage, age, gender and predominant site

Diagnosis	*n* (%)	Age range	Mean age ± SD	Gender		Predominant site
				Female	Male	
Malignant						
OSCC	359 (55.1)	23-75	46.62 ± 12.80	74	285	Buccal Mucosa
Mucoepidermoid Carcinoma	4 (0.6)	20-57	42.75 ± 16.87	1	3	Parotid gland
Acinic Cell Tumor	1 (0.2)	70	70	0	1	Parotid gland
B cell Lymphoma	1 (0.2)	50	50	0	1	Buccal Mucosa
Synovial Sarcoma	1 (0.2)	21	21	1	0	Buccal Mucosa
Benign/ Reactive						
Lobular Capillary Hemangioma	25 (3.8)	18-75	34.88 ±18.04	10	15	Dentoalveolar mucosa
Fibroepithelial Polyp/ Fibroma/ Epulis/ Peripheral Ossifying Fibroma	22 (3.4)	18-51	32.05 ± 10.91	9	13	Buccal Mucosa, Dentoalveolar mucosa
Squamous Papilloma	9 (1.4)	30-68		1	8	Buccal Mucosa
Hyperplastic Candidiasis	9 (1.4)	32-75	60.44 ±13.50	1	8	Buccal Mucosa
Lipoma	7 (1.1)	23-72	45.57 ±20.21	2	5	Buccal Mucosa,Cheek
Gingival Hyperplasia	7 (1.1)	19-75	37.14 ±19.77	2	5	Dentoalveolar mucosa
Aphthous Ulcer	5 (0.7)	32-62	49.20 ± 11.17	1	4	Buccal Mucosa
Dermoid Cyst	4 (0.6)	23-42	31 ± 8.21	0	4	Cheek
Giant Cell granuloma	3 (0.5)	21-40	32.67 ±10.21	1	2	Dentoalveolar mucosa
Sebacceous Cyst	3 (0.5)	26-52	39.67 ± 13.05	2	1	Cheek
Epidermal inclusion cyst	1 (0.2)	19	19	0	1	Buccal Mucosa
Pilomatricoma	1 (0.2)	20	20	0	1	Buccal Mucosa
Cavernous Hemangioma	1 (0.2)	24	24	0	1	Cheek
Necrotic Lymph node	1 (0.2)	30	30	0	1	Cheek
Neuroma	1 (0.2)	60	60	0	1	Buccal Mucosa
Mucocele	21 (3.2)	18-43	23 ± 6.59	6	15	Lower Lip
Pleomorphic Adenoma	8 (1.2)	23-54	34.13 ± 12.57	2	6	Parotid gland
Ranula	2 (0.3)	18-19	18.50 ± 0 .71	1	1	Floor of mouth
Sialadenitis	2 (0.3)	42	42	0	2	Submandibular gland
Premalignant						
Verrucous Leukoplakia	11 (1.7)	24-57	37.36 ± 10.01	7	4	Buccal Mucosa
Leukoplakia	10 (1.5)	39-65	54.50 ± 8.79	1	9	Buccal Mucosa
OSF	9 (1.4)	22-62	48.22 ± 13.88	2	7	Buccal Mucosa
Squamoproliferative Lesion	8 (1.2)	39-75	61 ± 14.04	2	6	Buccal Mucosa
Lichen Planus	4 (0.6)	30-61	43.75 ± 15.19	1	3	Buccal Mucosa
Erythroplakia	1 (0.2)	63	63	0	1	Palatal Mucosa
Total	**541 (82.9)**	**18-75**	**44.37 ± 14.77**	**127**	**414**	

common anatomical site for soft tissue lesions was buccal mucosa (50.9%, n=332), followed by mandibular dentoalveolar mucosa (7.4%, n=48) and lower lip (5.8%, n=38). Most frequent site for hard tissue lesions was posterior mandible (10.6%, n=69) and anterior maxilla (2.8%, n=18) respectively. According to anatomical site the distribution of lesions is shown in Table 1. Total (59.2%, n=386) were incisional biopsies while (40.8%, n=266) were excisional biopsies. Forty seven different histopathological diagnoses were established.

Most of the soft tissue lesions were malignant (55.6%), and the most common was oral squamous cell carcinoma (55.1%, n=359). In a total of 359 analyzed lesions of OSCC (74.4%, n=267) were OSCC of buccal mucosa, more common on right side (39.5%, n=142) other involved sites in decreasing order of frequency include dentoalveolar mucosa (8%, n=29), lateral border of tongue (7.3%, n=26), retromolar trigone (3.3%, n=12), lower lip (3.3%, n=12), ventral surface of tongue(0.8%, n=3), upper lip (0.5%, n=2) and floor of the mouth (0.2%, n=1). Benign soft tissue lesions accounted for (27.2%, n=183), where (3.8%, n=25) were lobular capillary hemangioma (pyogenic granuloma) occurring mainly at dentoalveolar mucosa with a gender distribution of male (2.3%, n=15) and female (1.5%, n=10). (3.4%, n=22) were different types of fibrous hyperplasia, with predominant anatomical site buccal and dentoalveolar mucosa and more frequent in males (2%, n=13) than females (1.4%, n=9).

Pleomorphic adenoma was most common salivary gland tumor (1.2%, n=8) with a male predilection (0.9%, n=6) as compared to females (0.3%, n=2) and most common site was parotid gland. Few rare malignant neoplasms of salivary gland, odontogenic and mesenchymal origin were also observed. Table 2 shows the distribution of all soft tissue lesions.

As regards to the hard tissue lesions (17.1%, n=111) most common were ameloblastoma (3.5%, n=23), followed by odontogenic keratocyst (2.6%, n=17) both occurring in posterior mandible. Other hard tissue lesions and their distribution, according to gender, mean age and predominant location are presented in Table 3.

Table 3. Distribution of hard tissue lesions according to number, percentage, age, gender and predominant site

Diagnosis	*n* (%)	Age range	Mean age±SD	Gender		Predominant Site
				Female	Male	
Ameloblastoma	23 (3.5)	18-40	26.35 ± 6.64	7	16	Posterior mandible
Odontogeic Kerato Cyst	17 (2.6)	18-29	21.76 ± 3.527	4	13	Posterior mandible
Radicular Cyst	15 (2.3)	18-50	26.67 ± 8.191	10	5	Anterior mandible
Mucormycosis	11 (1.7)	38-69	60.09 ± 8.396	0	11	Anterior maxilla
Unicystic Ameloblastoma	9 (1.4)	19-35	23.22 ± 4.94	6	3	Posterior mandible
Dentigerous Cyst	8 (1.2)	18-20	18.63 ± 0.744	2	6	Posterior mandible
Giant Cell Lesion	6 (0.9)	18-27	22.67 ± 3.67	1	5	Anterior mandible, Anterior maxilla
Ossifying Fibroma	4 (0.6)	18-22	19.50 ± 1.915	3	1	Posterior mandible
Osteomyelitis	4 (0.6	59-68	64.25 ± 4.113	3	1	Posterior mandible
Adenomatoid Odontogenic tumor	3 (0.5)	18	18	0	3	Anterior maxilla
Calcifying Odontogenic Cyst	3 (0.5)	27-50	36 ± 12.28	1	2	Posterior mandible
Osteochondroma	2 (0.3)	26-30	28 ± 2.828	2	0	Posterior mandible
Odontoma	2 (0.3)	23-43	33 ± 14.14	1	1	Maxilla
Burkitt Lymphoma	1 (0.2)	18	18	0	1	Posterior mandible
Odontogenic Ghost Cell Lesion	1 (0.2)	55	55	1	0	Anterior mandible
Paradental Cyst	1 (0.2)	23	23	0	1	Posterior mandible
Cementoma	1 (0.2)	41	41	0	1	Posterior mandible
Total	**111 (17.1)**	**18-69**	**29.61±14.66**	**41**	**70**	**Posterior mandible**

The patients were divided into two groups according to gender (i.e. male and female) and stratified for clinicopathological features i.e. anatomical site and histopathological diagnosis. Both of the parameters showed statistical difference when compared with gender ($p<0.002$) and ($p<0.001$) respectively.

DISCUSSION

In this study, most patients 23.6% belonged to 4th decade of life, followed by 5th and 3rd decades of life, which is in line with age distribution seen in other studies of our region.[10,11] There was ahigher incidence of biopsied lesions in males (74.2%, n=484) as compared to females (25.8%, n=168).

In this study OSCC forms the predominant type accounting for 55.1% of all lesions. Total (40.9%, n=267) was OSCC buccal mucosa with the most common subsite right buccal mucosa (21.7%, n=142) as compared to left side (19.1%, n=125). OSCC lateral border of tongue (4%, n=26) dentoalveolar mucosa (4.45%, n=29). One previous report supports these results in this region of the world.[12] In present study maximum number of cases were detected in 31 to 40 years age group and the mean age at diagnosis was 46.6 years. Western literature and previous studies from Pakistan, report majority of cases age incidence to be 5th decade of life.[10,12,16] These findings suggest that with passing years not only the incidence of OSCC is increasing but alarmingly it is affecting a much younger population. In current study male to female ratio for OSCC was (3.9:1; 79.4% to 20.6%), similar to international research and other studies in Pakistan which show male predominance.[10,13]

The most common soft tissue lesions were reactive lesions group, lobular capillary hemangioma (pyogenic granuloma) forming 3.8% of the biopsied lesions, next comes various types of fibrous hyperplasia 3.4% , all located mainly on dentoalveolar and buccal mucosa. Similar findings were reported in a study by Soyele and coworkers, in which most common lesions were pyogenic granuloma followed by fibrous hyperplasia.[14] On the contrary, other authors reported that fibroepithelial polyps were the most commonly identified lesions as compared to pyogenic granuloma.[1,15,16] Regarding mucosal lesions, the frequent types were proliferative verrucous leukoplakia 1.7% and leukoplakia 1.5% respectively. Leukoplakia was seen in males over 35 years of age. Previous studies also document leukoplakia to be more prevalent among other premalignant lesions.[1,17] In this series third most common was squamous papilloma 1.4%. However, one study revealed a little different prevalence among mucosal lesions, squamous papilloma was more common as compared to leukoplakia.[18]

Many studies have reported a high incidence of mucous retention cyts.[19] In this study mucocele represented 3.2% of the biopsies reviewed. Literature shows pleomorphic adenoma as the commonest benign salivary gland tumor.[15] In current study there were 1.2% cases of pleomorphic adenoma, mainly in parotid gland with a male to female ratio of 3:1. Most patients with pleomorphic adenoma belonged to 3rd decade of life. These findings are quite similar to a study by Saleh et al which reported a slight male predilection of benign tumors, also in a younger age group.[20] Malignancies of salivary gland in present study included mucoepidermoid carcinoma 0.6% and acinic cell tumor

0.3%. Sialadenitis was 0.3% only seen in submandibular gland. Among hard tissue lesions 12.8% were located in mandible, while 4.3% were present in maxilla. The single most common odontogenic tumor was ameloblastoma, 32 cases in a total of 111 hard tissue lesions, of which 3.5% were solid multicystic ameloblastoma and 1.4% were unicystic ameloblastoma. It mostly affected males and was more common in the 3rd decade of life. In contrast a study conducted in Saudia Arabia, showed ameloblastoma to be more common in females.[20] Various studies from Pakistan, Mexico, Japan, Nigeria, and Jordan suggest radicular cyst as the most common jaw cyst followed by dentigerous and OKC.[21] This study reports slightly different figures; most frequent representative was odontogenic keratocyst 2.6% followed by radicular cyst 2.3 % and dentigerous cyst 1.2%. Other odontogenic tumors were rare including odontogenic ghost cell tumor. Another significant observation is the frequency of mucormycosis (1.7%), a serious invasive fungal infection in maxilla. Eleven out of 111 hard tissue lesions were diagnosed, this shows increased number of mucormycosis in target population. Similarly, according to a study in recent years there has been a rise globally in incidence of mucormycosis, but in the Asian continent it is reported to be highest.[22] Only 4 cases of osteomyelitis (0.6%) with a mean age of 64.25 years and a female to male ratio of 3:1 were described in this study. These findings are consistent with studies worldwide.[23]

As this is a single centre study, the data in this study may not represent national epidemiology of oral and maxillofacial lesions. The pathological diagnoses are included from patients who underwent biopsy. Other cases with limited access to standard treatment, who did not undergo biopsy are missing in our study. It was not a very large population based study, but nevertheless it may help in monitoring disease patterns and changing trends. The data from this study may provide information regarding spectrum of common maxillofacial lesions for future research and planning.

CONCLUSION

This study provides information about distribution of oral and maxillofacial lesions and highlights OSCC as the single most frequent diagnosis involving a much younger male population. This data will be helpful for comparison with other countries.

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