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THE INCIDENCE, CLINICO-PATHOLOGICAL FEATURES AND MANAGEMENT OF PRIMARY DISEASES OF SALIVARY GLANDS

Surgery

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ABSTRACT

Background: Primary diseases of salivary glands have highly heterogeneous clinical and pathological features accordingly their management. Globally a lot of studies have been done, but till now there is no uniformly globally accepted study.
Objective: The objective were (1) to find out incidence of primary diseases of salivary glands (2) clinical and pathological presentation of disease (3)effectiveness of various modalities of treatment and there outcome.
Materials and methods: this is a prospective study of primary diseases of salivary glands in sasoon general hospital, pune Maharashtra. Datas collected from general surgery, dental and ENT departments**.**
Results: out of total 48 cases there were 19 tumors, 20 cystic lesions, 8 sialolithiasis and 1 sialadenitis. Thesis cases were analyzed according to the parameter of age, sex, location, clinical features, radiographic findings, histopathological appearance, and medical modalities used to treat and there outcome. These were compared with the studies conducted in the other parts of the world.
Conclusion: in conclusion, the data and results obtained here were similar to previously published articles and literatures in other countries and other parts of India and world. However, some differences were observed, these differences may be due to racial factors, pathology centers of sample collection and duration and timing of studies.

KEYWORDS

salivary gland tumors, sialolithiasis and sialadenitis

INTRIODUCTION

The salivary gland system can be divided into two distinct exocrine groups. The *major salivary glands*-3 pairs in number 1) parotid 2) submandibular and 3) sublingual glands.

The mucosa of upper aero-digestive tract is lined by hundreds of *small minor salivary glands*[1].Salivary glands are important structures which secrete saliva, that make oral cavity moist and take part food digestion process. Salivary secretion mostly composed of water, digestive enzymes, electrolytes [2,3] organic compounds[2]and immunoglobulin[4]. There is a lot of primary and secondary pathologies which affect both morphological and pathological features and ultimately the quality of life of affected individual. The secretion rate is as high as 1 ml per gram of gland per minute [3]. The high flow rate and continuous flow of saliva reduces the accumulation of bacteria in the oral cavity thus reducing the chance of infection. . However salivary glands develop diseases (primary or secondary) and conditions that affect their basic functions. Various kinds of metabolic disorders, infections (viral, bacterial, fungal) neoplastic conditions (benign & malignant) cyst and sometimes trauma can affect functions of salivary glands which cause physical, physiological and psychological impairment of patients. Except for acute Infections which are usually painful, most of the salivary gland diseases rarely present any symptoms during the early stages[5].Becouse of this most of the patients come to the hospital with delay with advanced disease and complications. Most of the salivary gland disorders do not have unique features. Because of complicated anatomy of maxillofacial region it requires sophisticated radiological imaging like x ray, USG, CT scan and MRI to accurately see the extension of disease. This provides a road map to treat the disease. Unfortunately, most of these investigations are not available at peripheral health centers. Histological investigation is very important to confirm the diagnosis. The treatment of salivary gland disease mostly depends on nature of disease. Mostly tumors require surgical interventions.

Salivary gland disease /disorder occur to all age group and both sexes. But infectious diseases mostly occurs in children and malignancy occurs in elderly population. Order of Incidence of salivary gland neoplasm is parotid gland, submandibular gland, minor salivary glands then submandibular gland[6].80% salivary gland neoplasms are found to be in parotid gland[5]

Bacterial infections needed antibiotics while viral infections require symptomatic treatment and reassurence. In spite of advancement in oncology there is no widely accepted chemotherapy and because of its radio resistant nature surgical management is the only choice treatment.

DISAEASES OF SALIVARY GLANDS

Like other organs salivary glands are also susceptible for various kinds of diseases. Broadly salivary glands diseases can be divided into two groups

1. Primary salivary gland disease
2. Secondary salivary gland disease

1. Primary salivary gland diseases:
All those disease of salivary gland which are primarily originated in salivary gland are called primary salivary gland disease. This includes

1. Infectious diseases
- Viral infections
- Bacterial infections

2. Cystic lesions
- Ranula
- Mucocele
- Lymphoepithelial cyst

3. Benign tumors
- Pleomorphicadennoma
- Basal cell adenoma
- Cyst adenoma

4. Malignant tumors
- Adenocarcinoma
- Mucoepidermoid carcinoma
- Adenoid cystic carcinoma
- Squamous cell carcinoma
- Acinic cell carcinoma

5. Other lesions
- Sialolithiasis
- Sialoadenitis

2. Secondary diseases are those which are due to some other primary disease.

Ackerman del Regato summarized the biological behavior of salivary of salivary glands as" The usual tumors of salivary glands is a tumors in which the benign variant is less benign than the usual benign tumor and the malignant variant is less malignant than usual malignant tumors"

Aims and objectives:

the study was undertaken with following aims and objectives

(1) To find out incidence of primary diseases.
(2) Clinical and pathological presentation of disease.
(3) Effectiveness of various modalities used for treatment and their outcome.
(4) To correlate the various primary diseases of salivary glands according to age, sex, location, management, and outcomes and compare of finding of this study with studies conducted in other countries.

MATERIALS AND METHODS

It is a prospective study and conducted in department of general surgery at Sasoon general hospital, Pune, Maharashtra of total 48 cases, 3 pleomorphic adenoma, 8 adenocarcinoma, 2 mucoepiermoid carcinoma, 8 sialolithiasis and 1 of following basal cell adenoma, cystic adenoma, adenoid cystic carcinoma, squamous cell carcinoma, acinic cell carcinoma, and lymphoepithelial cyst. These cases were analyzed considering the parameters such as age, sex, location, clinical finding, radiological finding, histopathological appearance management, and outcomes and compare of finding of this study with studies conducted in other countries.

Statistical analysis was done using spss software.

OBSERVATIONS AND RESULTS

Clinical analysis

A total 48 cases of primary salivary gland disease were studied out of total 3118 patients visited to department of general surgery, ENT, and dental at Sasoon general hospital, Pune, Maharashtra. Hence, the overall incidence rate during the study period of 18 months was found to be 1.5 per 100.

Incidence of tumors19 (0.60%) was found slightly higher than ranula16 (0.51%) but overall cystic lesions are more common than the neoplastic one. Incidence of malignant tumors was 14(0.44%) while benign tumors was almost half 5(0.2%) of malignant tumors. Cystic lesions was around20 (0.64%). Incidence of cystic lesions are slightly higher than that of tumors. Incidence of tumors were more in major salivary glands (table 2). Over all major salivary glands are more prone for disease, 38 cases were found in these glands while minor salivary glands were involved only in 10 cases.

Analysis of primary disease of salivary glands:

Salivary gland lesions mostly occurs in young female patient with age group of 18 to 40 years. Overall most of the primary disease occurs in major gland. In this study ranula is the most common lesion was found in 16 cases (33.33%), and it exclusively presented in sublingual glands. Among tumors parotid glands are most commonly involved (9 cases 47.4%). Sublingual glands are free from neoplastic involvement. Only 3 neoplastic cases are found in submandibular glands. 40% of benign and 28.6 % malignant tumors were found in minor salivary glands while 71.4% malignant and 60% of benign tumors were found in major glands. Among minor salivary glands palate was the most common site for neoplastic growth while single case was reported in buccal mucosa, floor of mouth and labial mucosa. Swelling was the most common clinical presentation; squamous cell carcinoma was presented with most severe complication like facial nerve palsy and ulceration. Most common treatment modalities are surgical excision, analgesics, and antibiotics.

Table 1: distribution of salivary gland diseases according to age and sex

Type of lesion	Diagnosis	18-28yrs M F	29-39yrs M F	40-50yrs M F	51-61yrs M F	62-72yrs M F	73-83yrs M F	TOTAL M F
Benign tumor	Pleomorphic adenoma	- 1	1 -	1 -	- -	- -	- -	2 1
	Basal cell adenoma	- -	- -	1 -	- -	- -	- -	1 0
	Cyst adenoma	- -	- -	- 1	- -	- -	- -	0 1
Malignant tumors	Adenocarcinoma	- 1	1 0	- 2	- 1	- 2	- 1	1 7
	Mucoepidermoid Carcinoma	- 1	- -	- -	- 1	- -	- -	0 2
	Squamous cell carcinoma	- -	- -	- 1	- -	- -	- -	0 1
	Adenoid cystic carcinoma	- 1	- -	- -	1 -	- -	- -	1 1
	Acinic cell carcinoma	- -	- -	- 1	- -	- -	- -	0 1
Cysts	Ranula	4 6	3 2	- -	- -	- 1	- -	7 9
	Mucocele	1 2	- -	- -	- -	- -	- -	1 2
	Lymphoepithelial cyst	- -	- -	- 1	- -	- -	- -	0 1
Others	Sialolithiasis	3 1	- 2	- 1	- 1	- -	- -	3 5
	Nonspecific chronic sialadenitis	- 1	- -	- -	- -	- -	- -	0 1
	Total Grand total	8 14 22(45.8%)	5 4 9 (18.6%)	2 6 8(16.7%)	1 3 4(8.3%)	0 3 3(6.3%)	0 1 1(2.08%)	16 32 48(100%)

Table 2: Locations of primary salivary glands diseases

Salivary glands	Benign tumors	Malignant tumors	Cystic lesions	sialolithiasis	sialadenitis	Total
Major glands	3(0.09%)	9(0.28%)	17(0.57%)	8(0.25%)	1(0.03%)	**38(1.2%)**
Minor glands	2(0.06%)	5(0.16%)	3 (0.06%)	0	0	**10(0.32%)**
Total	**5(0.16%)**	**14(0.44%)**	**20(0.64%)**	**8(0.25%)**	**1(0.03%)**	**48(1.53%)**

Table 3: Incidence of primary lesions in various salivary glands

Type of lesion	Diagnosis	parotid	Submandibular	sublingual	Lower lip	Buccal mucosa	palate	Total
Benign tumor	Pleomorphic adenoma	2	- -	1	-	- -	-	3 (0.10%)
	Basal cell adenoma	- -	- -	- -	- -	1	- -	1 (0.03%)
	Cyst adenoma	- -	- -	- -	- 1	- -	- -	1 (0.03%)
Malignant tumors	Adenocarcinoma	5		- -	- -	1	2	8 (0.26%)

	Mucoepidermoid Carcinoma	- -	- -	- -	- -	1	1	2 (0.06%)
	Squamous cell carcinoma	- -	- -	- -	- 1	- -	- -	1 (0.03%)
	Adenoid cystic carcinoma	-	2	-	- -	- -	- -	2
	Acinic cell carcinoma	1	- -	- -	- -	- -	- -	1 (0.03%)
Cysts	Ranula	- -	- -	16	- -	- -	- -	16 (0.51%)
	Mucocele	- -	- -	-	3	- -		3 (0.10%)
	Lymphoepithelial cyst	1	-	- -	- -	- -	-	1 (0.03%)
Others	Sialolithiasis	1	7	- -	-	- -	- -	8 (0.26%)
	sialadenitis		1	- -	- -	- -	- -	1 (0.03%)
	Total	10 (0.32%)	10 (0.32%)	17 (0.55%)	5 (0.16%)	3 (0.10%)	3 (0.10%)	48 (1.53%)

Table4:clinical features of salivary gland diseases

Type of lesion	Diagnosis	Swelling	Ulcer	Pain	Facial palsy
Benign tumor	Pleomorphic adenoma	3	- -	-	-
	Basal cell adenoma	1	- -	- -	-
	Cyst adenoma	1	- -	- -	-
Malignant tumors	Adenocarcinoma	8		2	-
	Mucoepidermoid Carcinoma	3	- -	- -	- -
	Squamous cell carcinoma	1	1	1	1
	Adenoid cystic carcinoma	1		-	- -
	Acinic cell carcinoma	1	- -	- -	- -
Cysts	Ranula	16	- -	-	- -
	Mucocele	3	- -	-	-
	Lymphoepithelial cyst	1	-	- -	- -
Others	Sialolithiasis	8	-	3	-
	sialadenitis	1	-	1	- -
Total	N %	48 (100%)	1 (2.08%)	7 (14.6%)	1 (2.08%)

Table 5: Treatment modalities used for salivary gland diseases

	Diagnosis	observation	Analgesic	Antibiotics	surgery	Radiotherapy	Chemotherapy
Benign tumors	Pleomorphic adenoma	-	-	-	3	-	-
	Basal cell adenoma	-	-	-	1		
	Cyst adenoma	-	-	--	1		
Malignant tumors	Adenocarcinoma	-	-	-	8	-	1
	Mucoepidermoid carcinoma	-	-	-	2	-	2
	Adenoid cystic carcinoma	-	-	-	2	-	-
	Squamous cell carcinoma	-	1	1	1	1	1
	Acinic cell carcinoma	-	1	1	1	-	1
Salivary cyst	Ranula	3	-	4	8	-	-
	Mucocele	1	-	1	1	-	-
	Lymphoepithelial cyst	1	-	-	-	-	-
Others	Sialolithiasis	2	2	4	2	-	-
	Non-specific chronic sialoadenitis	-	1	1	1	-	-
Total		7(14%)	5(10.4%)	12(25%)	30(62.5%)	3(6.25%)	5(10.4%)

DISCUSSION

Salivary gland diseases constitute an important area in the field of general surgery, dental and ENT, but complicated cases are mostly managed by oral and maxillofacial surgeons. A number of studies already have done worldwide; the comparison amongst these studies is very difficult. Some studies have limited to only one disease or only one glands and have not included the minors glands. In addition, the evolving study system and classification system make an evaluation of some older studies system very difficult, especially when we try to compare the very recent analysis. In spite of these difficulties , it is still very helpful to compare these studies because these provide a lot of informations and over views of salivary gland diseases in general[6]

This was a longitudinal descriptive study at tertiary care teaching hospital. This study was carried out on 48 patients of age range from 18 to 83 years.

In present study incidence of salivary gland disease is more among the young people as compare to older one. It is may be due to the incidence of non-neoplastic diseases 29 (60%) are more and these mostly occurs in younger patient. These lesions grows fast (cystic lesions) or produce symptoms (sialolithiasis) early.

Over all, salivary gland disorders are more common in female than male(2:1).Many other literatures have the similar kind of female predominance result like **Ali Ali AL-Zamzami**[7] in Yemen(1.2:1),and **Zhao et al**[8] in India. However another study done in India in 2004 by **Nitin et al**[9] it showed male predominant(male 19 female 17=1.1:1). In our study non neoplastic lesion are more common than

neoplastic.Non neoplastic lesions are 29(60.4%) while neoplastic are 19(39.6%).**Zhao et al**[8] and **Al Khateeb et al** [10] also have non neoplastic predominance incidence rate. Among cystic lesions Ranula was the most common type (78.9%) and second most type was mucocele (15.8%). Ranula was the most common cyst mostly seen in sublingual glands(similar finding has been reported by Davison MJ, Marton RP plunging ranula ,clinical observations, head and neck 1998). Males (7) were affected less than female (9), male to female ratio was 0.7:1.Patients age were ranged from 18 to 61 years. Pang C E, Lee T S**, Pang K P,et al** [11] carried a study in 2005 and they also found female predominant nature of disease. In their study male to female ratio was 1:1.4 and majority of the patient were under 60 years of age. **Sharma P, Sharma R, Nagrath et a**l[12] in 2015 also found the prevalence of oral ranula was more under 60 years of age But in our study majority of patients (89%) were found below the age of 40 years. Most of the ranula managed by surgical intervention recurrence of ranula in incision and drainage case in 50%, marsupialization 25% and in excision is 12% According to study carried by **1Zhao Y, Jia J, Jia Y. in 2005** [13] the recurrence rates of ranula depends on treatment modalities used to treat the disease. If ranula managed by incision and drainage the recurrence rate was around 70% to 100%, for marsupialization drainage the recurrence rate was around 36.4% to 80%, for ranulas treated with excision of ranula along with sublingual salivary gland the recurrence rate ranges from 0% to 3.8%.97 Mucocele mostly found under 30 years of age but **Baurmash HD**[14] in their study they found the paek age was 10 -20 years. Most frequent site is lower labial mucosa98.Gross appearance of the mucocele is pathognomic and diagnosis is based on its appearance , growth ,trauma history and consistency. If there is any doubt in etiology radiological examination can be done. FNAC may show mucous retention phenomenon. Modality of treatment for most of the mucocele is surgical excision with removal of involved minor glands. Recurrence rate is very low. Recurrence only seen in marsupialization.Yamasoba T, Tayama N in 1990; also reported recurrence in in marsupialization Sialolithiasis is the disease of submandibular gland. It mostly found in young female. Clinical presentation is pain mostly during feeding. Diagnosis is mainly based on clinical and radio logical examination. Management is stone extraction either by surgical or by scopy. Recurrence rate is very high in scopy. There is a lot of studies on neoplastic growth of salivary have done in past, but most of these studis had only major salivary glands. A study done by Sardar et al at dental college and hospital, Nagpur and published in SRM journal of research in dental in 2018. According to this report the annual incidence of salivary gland tumors varies around the world from approximately 0.04-13.5/100000 population. In present study the frequency of neoplasm is 0.06% .thus these finding correlate well with **Leegaard and Lindeman**[15]

In present study most of the tumors 12 (63%) found in major salivary gland and in minor salivary gland it is found only in 7 (37%) patient. Similar kind of trends of major gland involvement was reported by **spiro**[16], **Eveson and Cawson**[17],**Seifert et al**[18],**Thackray and Lucas**[19].

I our study I found 22.2% of the parotid tumors are benign, all of which were diagnosed as pleomorphic adenoma.

This is in contrast to almost all previous studies by , **Eveson and Cawson**[17]**, Thackray and Lucas**[19].wherein benign tumors accounted for 65.3% to 85.39%.

In the present study total 7 tumors are found in minor salivary glands. Out of these, 2 tumors (28.5%) are benign and 5 (71.5%) are malignant these finding are contrast to the finding of other studies, that **is Eveson and Cawson**[17], **Ellis et al**[20].

Eveson and Cawson[17], Ellis et al[20] reported that pleomorphic adenoma was the most common benign tumor of minor salivary gland but in our study monomorphic adenoma was the most common benign tumor. In our study most common tumor of minor salivary gland is adenocarcinoma. Higher prevalence of malignant tumors in minor salivary is also reported by **lopes et**[21].

in our study benign tumors are male predominant,60% benign tumors was found in male while in female it is reported only 40% (M:F=1.5:1), which was in correlation with the finding of **Leishram et al**[22], and **Gonzalez et al**[23]this was in contrast to **Crocket et al**[24] **Frank Bergman**[25] and **Neely MM et al**[26] found no significant difference in sex distribution in benign tumors.

The variation in these finding may be due to paucity of cases in our study because salivary gland swellings are not referred so frequently to the general surgery department.

Out of the total tumors of parotid around 77.77% tumors are malignant in natrure. It is contrary to the finding of Eveson and Cawson,[17] Rajesh singh et al111 where the malignant tumors are accounted only for 16.6 to 34.2%. In our study around 75% of all submandibular tumors are malignant in nature. This is contrary to the studies by Eveson and Cawson[17], Ellis et al104, **Rajesh singh et al**[27], Thackray and Lucas[19] where malignant tumors varied from 30.3% to 56.1%.

In minors salivary glands tumors, around 71.42% tumors are malignant in nature. spiro100 in his study found 80% of malignancy rate lopes et al105 also reported higher prevalence rate of malignancy in minor salivary gland In the present study, malignant tumors are mainly found in 40 – 60 years of age (mean age 48 years). Crocket et al[24].**Satko et al**[28].in Slovakian population, and **Ahmad et al**[29] in Kashmir also found same age group in case of malignant tumors (40-60 years)

As for as gender distribution, it is found more commonly in female with male to female ratio of 1:6.). Crocket et al[24] and **kusama et al**[30] aslo reported female preponderance in malignant tumors while Neely MM et al[26] found so significant difference in sex distribution in malignant tumors Most of the literature reported that surgical excision is the best modality for the malignant tumors . For advanced stage malignancy, surgery with post operative radiotherapy are better options.

Recurrence rate of malignant tumors was 7.14% within 14 months of follow up. But late recurrence rate was 18%115. In present study recurrence rate is low it may be due to short duration of study.

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