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ORIGINAL ARTICLE

SALIVARY GLAND LESIONS: A RETROSPECTIVE STUDY OF 100 CASES OF SALIVARY SWELLING PRESENTING FOR FNAC AT CYTOPATHOLOGY DEPARTMENT, CIMS, BILASPUR

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ABSTRACT: BACKGROUND: Fine-needle aspiration cytology (FNAC) of the salivary gland is a time tested, cost effective, reliable and safe technique in the diagnosis of both neoplastic and non-neoplastic lesions of the salivary gland. It also helps to eliminate confusion with lymphadenopathies as there is a lot of overlap in the clinical presentation of both salivary gland and lymph node swellings. Here we aim to study the incidence of common salivary gland pathologies in our set up and also attempt to analyze the role of FNAC in differentiating between sialadenopathies and lymphadenopathies. **METHODS:** A retrospective study of 100 consecutive patients clinically diagnosed with salivary gland pathologies and referred to Cytopathology Section, Department of Pathology, CIMS, Bilaspur for FNAC was conducted from 01.04.2004 to 07.05.2010. Clinically diagnosed lymph node swellings which subsequently evinced salivary gland cytopathology were also included in this study. The lesions were classified based on cytomorphological diagnostic criteria and different incidental parameters like age, sex, location, presenting symptoms, duration of complaints etc were calculated. **RESULTS:** The lesions were broadly categorized cytomorphologically into non-neoplastic salivary gland lesions (42.5%), benign neoplastic salivary gland lesions (46.25%) and malignant salivary gland lesions (11.25 %) after excluding the negative results (aspiration failure, inadequate material, non salivary cytopathology). M:F Ratio was 1.56:1 (61:39). Parotid was the most common salivary gland involved (47.5%). The most common benign salivary neoplasm was pleomorphic adenoma (38.75%) and the most common malignant neoplasm was mucoepidermoid carcinoma (7.5%). **CONCLUSION:** FNAC is a reliable, safe and simple outpatient procedure in the diagnosis of salivary gland lesions, and is also of some value in distinguishing salivary lesions from clinically indistinguishable non salivary swellings occurring in the same locations.

KEYWORDS: FNAC, Salivary Lesions, Pleomorphic Adenoma, Mucoepidermoid Carcinoma

INTRODUCTION: A mass in the salivary gland region often presents a diagnostic challenge with regard to its site of origin (salivary versus nonsalivary), benign or malignant nature, and tissue-specific diagnosis.[1] FNA cytology provides accurate diagnosis of most salivary gland lesions and contributes to conservative management in many patients with non-neoplastic conditions.[2] It also provides a convenient way to differentiate between ambiguous swellings especially of the parotid and submandibular regions and therefore has now become a diagnostic test of choice to solve this clinical dilemma.[3]

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MATERIALS AND METHODS: A retrospective study of 100 consecutive patients clinically diagnosed with salivary gland pathologies and referred to Cytopathology Section, Department of Pathology, CIMS, Bilaspur for FNAC was conducted from 01.04.2004 to 07.05.2010. Clinically diagnosed lymph node swellings which were later proven to contain salivary cytopathology were also included in this study in order to analyze the efficacy of FNAC in differentiating between ambiguous swellings of parotid and submandibular regions. Detailed history-taking and physical examination was undertaken in all cases. Information was collected regarding age, sex, nature and duration of presenting complaints, as well as location and size of the lesions. The locations of the lesions were grouped under the following headings-parotid, submandibular, sublingual, temporo-mandibular angle, & minor salivary glands. Swellings at or near the angle of mandible which could not be clearly categorized to be of parotid or submandibular gland origin on examination were labeled as temporo-mandibular angle swellings.

FINE NEEDLE ASPIRATION: FNAC was performed using 22-24G disposable needles and 10 ml disposable plastic syringe. An average of 2-3 passes in each case was made to ensure thorough and representative sampling. An average minimum of 3 slides were usually prepared from the aspirated material. Some smears were air-dried while others were fixed in 95% ethanol. The fluid contents of cystic lesions were centrifuged and smears prepared from the centrifuge sediments.

Staining: Slides were stained with MGG, PAP and H&E stains and examined under the microscope.

Cytopathological Impression:
The lesions were classified under the following heads:

- Aspiration failure (repeated passes did not yield any material or yielded only blood).
- Material inadequate for opinion (diagnostic cytology could not be appreciated even after repeated attempts at re-aspiration).
- Non-neoplastic salivary lesions.
- Neoplastic benign salivary lesions.
- Malignant salivary gland lesion.
- Benign non-salivary lesions.
- Malignant non-salivary lesion.

OBSERVATION: Out of the total number of 100 cases, 61 were males (61%) and 39 females (39%). M:F Ratio was 1.56:1. The patients were divided into 10 yrs age ranges, the youngest being 10 months old and the oldest 73 yrs. Mean age at presentation was 36.59 yrs. Maximum patients presented with disease between 21-50 yrs age (57%). A male predominance in incidence was observed along all age groups except for the 0-10yr and 21-30 yrs ranges, which had equal sex incidence and a female predominance respectively. Most patients presented with swelling. Non-neoplastic lesions were of shorter duration (<3months) while neoplastic lesions showed longer duration (>3 months). Parotid was the most common salivary gland involved (47.5%) in non-neoplastic (35.29%) as well as neoplastic lesions (56.52%). The lesions were broadly

categorized cytomorphologically into non-neoplastic salivary gland lesions (42.5%), benign neoplastic salivary gland lesions (46.25%) and malignant salivary gland lesions (11.25%) after excluding the negative results (aspiration failure, inadequate material, non salivary cytopathology). The inadequate sampling rate in this study was 6%.The most commonest non-neoplastic lesions were chronic nonspecific sialadenitis and retention cysts (12.5% each), commonest benign salivary neoplasm was pleomorphic adenoma (38.75%) and the commonest malignant neoplasm was mucoepidermoid carcinoma (7.5%).

DISCUSSION: Fine-needle aspiration cytology (FNAC) is used as the main initial diagnostic investigation for lumps in the head and neck region. Major salivary glands and some minor salivary glands are easily accessible; therefore, they are optimal targets for FNAC.[4] FNAC also has some role as a quick, easy and cost-effective means of diagnosing and differentiating between clinically ambiguous head and neck swellings.[3] The present study was undertaken with an aim to study the incidence of salivary gland lesions at our setup.

1. **Age & Sex:** The total number of cases consisted of 61 males (61%) to 39 females (39%), who were divided into 10 yrs age ranges. The age spectrum was spread widely over a range of 10 months-73 yrs, which was concordant with the findings of other authors.[1,5] Mean age at presentation was 36.59 yrs. Maximum patients presented between 21-50 yrs age (57%). Almost identical finding have been reported by Ashraf et al[6] and other authors.[7,8,9] A male predominance in incidence was observed along all age groups except for the 0-10yr and 21-30 yr ranges. In the 0-10 yr age group, an equal incidence was observed in both sexes, while females predominated in incidence in the 21-30yr age group. The overall M:F ratio was calculated to be 1.56:1 which correlated reliably with the findings of Arul P et al[9] as well as other authors.[1,4,7,8] (Table 1) The most frequent age at presentation was between 21-30yrs (23.75%), followed by the 31-40yrs and 41-50 yrs (17.5% each). However malignant neoplasms favored a later age of presentation, i.e., 61-70yrs. Corroborative findings were reported by Omhare et al. and Arul P et al.[8,9] (Table 5a) An increased incidence of disease was noted among male patients over females throughout all the cytologically designated categories. This disparity was most remarkably evident in case of malignant salivary tumors in which there was an exclusive male predominance. (Table 5b) This lesser frequency of disease presentation in females correlates with the findings of Omhare et al[8] and may be attributed to the poor level of awareness among female patients of the low socioeconomic strata which form the major chunk of patients at our setup.

2. **Presenting Complaints:** Among the presenting complaints, salivary gland swelling was the most commonly observed feature, being present in 98% of cases. Only one patient presented with diffuse induration in the submandibular region while another presented with an ulcer in the parotid region. Bilateral swellings were seen in 5 cases (parotid=2, submandibular=2, tm angle=1) and recurrent swellings in 3 cases (parotid=2, submandibular=1). The next commonest complaint was pain, followed by fever. Other less common complaints were fever,

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cough, weight loss, dysphagia and oral ulcer. (Table.2) Similar clinical presentations were documented by Nagarkar et al.[10]

3. **Site:** Parotid gland was the most preferred location (47.5%) cases, followed by submandibular gland (26.25%). Swellings at or near the angle of mandible which could not be clearly categorized to be of parotid or submandibular gland origin on examination were labeled as temporo-mandibular angle swellings. These swellings accounted for 18.75% cases. The sublingual and minor salivary glands were least commonly involved (3.75% each). All the aforementioned findings correlated with those of multiple authors[1,4,9]. We encountered lesions in 3 minor salivary glands of palate, lower lip and inner cheek wall, out of which the palatal lesion was a pleomorphic adenoma, and the other two were retention cysts. Maximum incidence of retention cysts was seen in submandibular and sublingual salivary glands (n=3, each). All the sublingual gland swellings were retention cysts. Parotid was the most common location for non-neoplastic (35.29%) as well as neoplastic lesions (56.52%). Majority of the malignant salivary tumors arose in the parotid glands (55.55%), even though mucoepidermoid carcinoma showed equal predilection for parotid and submandibular glands. (Table.5c). Here our findings deviated from those of other authors as most references cite low incidence of mucoepidermoid carcinomas in the submandibular gland.[11]

4. **Duration:** A wide range was observed in the duration of symptoms, from as short as 3 days to as prolonged as 12 yrs. However, maximum patients presented between 1-5yrs. Non-neoplastic lesions presented with shorter durations (<3mnths) while neoplastic lesions presented with longer duration (>3mnths) of symptoms. (Table 3)

5. **Cytodiagnosis:** Out of the 100 cases studied, there was aspiration failure in 4 cases, due to varied causes like technical in expertise of junior faculty (n=1), very small size of lesion(n=1) and uncooperative patient (n=2). The aspirated material was inadequate for diagnosis in 2 cases, even after multiple re-aspiration attempts. The inadequate sampling rate of 6% found in this study was well within the 5-10% inadequacy rate reported in literature.[7,9] The rest of the lesions were classified cytomorphologically into Non-neoplastic Salivary Lesions (42.5% of all salivary lesions), Benign Neoplastic Salivary Lesions (46.25% of all salivary lesions), Malignant Salivary Lesions (11.25% of all salivary lesions). Corroborative findings were reported by Singh Nanda et al, Omhare et al. and Arul P et al.[4,8,9]

   (Table 4) Out of the non-neoplastic salivary lesions, chronic inflammatory lesions made up the largest group (76.4%, n=26 out of 34). Among these, retention cysts and non-specific chronic sialadenitis were encountered most frequently (incidence-12.5%, n=10 in each case). Coexistence of chronic sialadenitis with retention cyst was seen in 1 case and 2 cases showed acute-on-chronic sialadenitis. 3 cases of granulomatous sialadenitis (8.8% of non-neoplastic lesions & 3.75% of all salivary lesions) were reported due to the presence of lymphocytes, epitheliod granulomas, giant cells and caseous necrosis and fibrosis in addition to salivary gland tissue. The other non-neoplastic lesions were acute sialadenitis (n=5), sialadenosis

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(n=2) and normal submandibular salivary gland (n=1). (Table 4, 5) All these data were found to be in concordance with the reports of various authors.[7,8,9]

Among the benign salivary gland tumors, pleomorphic adenomas were the most common (83.8% of all benign salivary tumors and 38.75% of all salivary lesions), which was corroborated by the studies of Das et al[1] and other authors.[7,8,9] Some of these tumors had mildly atypical features, but 2 cases had significant amount of mild-to-moderate atypia to be reported as cellular pleomorphic adenoma. Cystic change was noted in 1 pleomorphic adenoma, while 1 case showed recurrence in a previously operated pleomorphic adenoma. We also reported two cases of monomorphic adenoma-1 of the canalicular variant and 1 of the basal cell variant. The other less common benign tumors in our experience were plamacytoid myoepitheliomas (n=2), Warthin's Tumor and oncocytoma (n=1, each). (Table.4). All these data were found to be in concordance with the reports of various authors.[7,8,9]

However, in the case of malignant salivary neoplasms, there was a lot of discordance among the findings of various authors with the incidence of malignant tumors in various studies ranging from 15% to 32%.[9] In our study, malignant salivary neoplasms were found to be much less frequent in comparision to non-neoplastic lesions and benign salivary tumors. We found the incidence of malignant tumors in the present study to be 11.25%, which was lower than the findings of Jain et al,[7] Omhare et al,[8] and Arul et al,[9]but closer to the 12% incidence recorded by Nguansangiam et al[5]. Mucoepidermoid carcinomas were the most common malignant salivary neoplasms (7.5% of all neoplastic salivary lesions & 66.6% of all malignant salivary tumors). Out of these, 3 cases were low grade, 2 cases high grade and 1 of intermediate grade. The other malignant salivary tumors reported were acinic cell carcinoma, salivary duct carcinoma and carcinoma ex pleomorphic adenoma (n=1, each). (Table.4). Our findings tallied with those of Omhare et al[8] and Arul et al[9] but differed from the findings of Stewart et al,[2] Naz et al[3] and Nguansangiam et al[5] who found lymphomas to be the commonest malignant tumors and Diaz et al,[12] who reported acinic cell carcinomas to be the commonest malignant tumors.

6. **Diagnosis of Ambiguous Swellings:** As mentioned at the outset, considerable clinical diagnostic overlap was found in the case of painless salivary gland swellings of medium duration. 14 cases clinically diagnosed to be salivary gland lesions showed nonsalivary gland pathology which were further subdivided into non-neoplastic (n=12) and neoplastic categories (n=2). Maximum cases (n=11) showed features of lymphadenitis. Chronic granulomatous lymhadenitis was the most commonly misdiagnosed lesion (n=9). We also reported 1 case each of viral and chronic suppurative lymphadenitis and 1 case of Hodgkin's lymphoma involving in the intraparotid lymph node. 1 case each of dermoid cyst and giant cell tumor of maxillary bone made up the rest of the non salivary cytopathology. (Table 4, 5) Conversely, 21 cases of clinically diagnosed lymph node lesions were cytologically proven to possess salivary gland pathology. Most of these lesions were submandibular gland swellings (n=9), followed by parotid swellings (n=7), swellings in tm angle (n=4), and submental swelling (n=1). This ambiguity was thought to be caused due to coexistence of lymph nodes near all the major salivary glands and similarity of presenting symptoms of chronic lymphadenitis and chronic

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sialadenitis (painless swelling of medium duration). As evidenced by our study, most of these ambiguous swellings turned out to be granulomatous lymphadenitides. Due to the overwhelmingly high incidence of tuberculosis and tubercular lymphadenitis seen in our setup,[13] it becomes difficult for the clinician to be able to clinically categorise a neck swelling to be of salivary or lymph node origin with sufficient degree of confidence. The scenario becomes more confounding with swellings originating in the submandibular region. Here FNAC has an important role to play as a quick, easy, cost-effective and minimally invasive procedure which can help in differentiating between salivary gland and lymph node swellings and point the clinicians towards a correct diagnosis.

CONCLUSION: FNAC is an easy, cost effective and highly reliable technique for pre-operative diagnosis of salivary gland tumors in hands of experienced cytopathologists. Due to the minimally invasive nature of this technique, FNAC offers valuable information for the planning of subsequent therapeutic management and helps to avoid unwarranted surgery. It also has a significant role in differentiating between ambiguous neck swellings and helps to point the clinicians towards a correct diagnosis. Thus it can be concluded that FNAC should be adopted as the initial investigation for all salivary gland swellings.

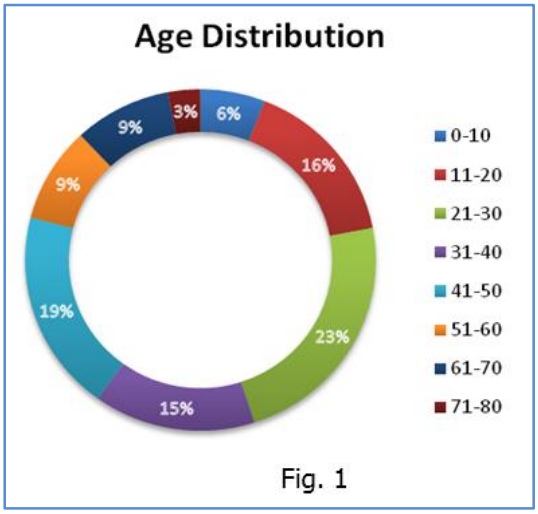

Fig. 1

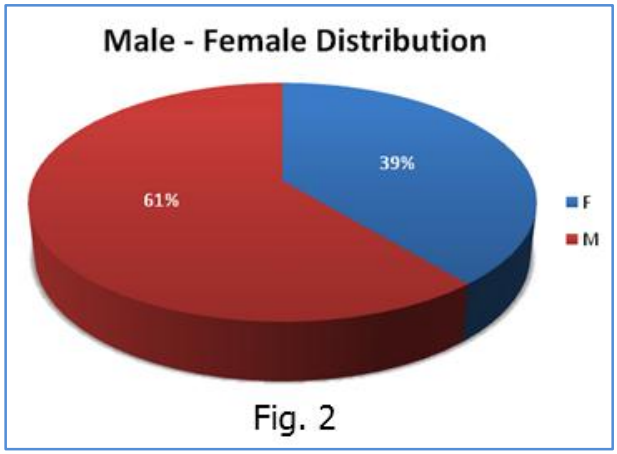

Fig. 2

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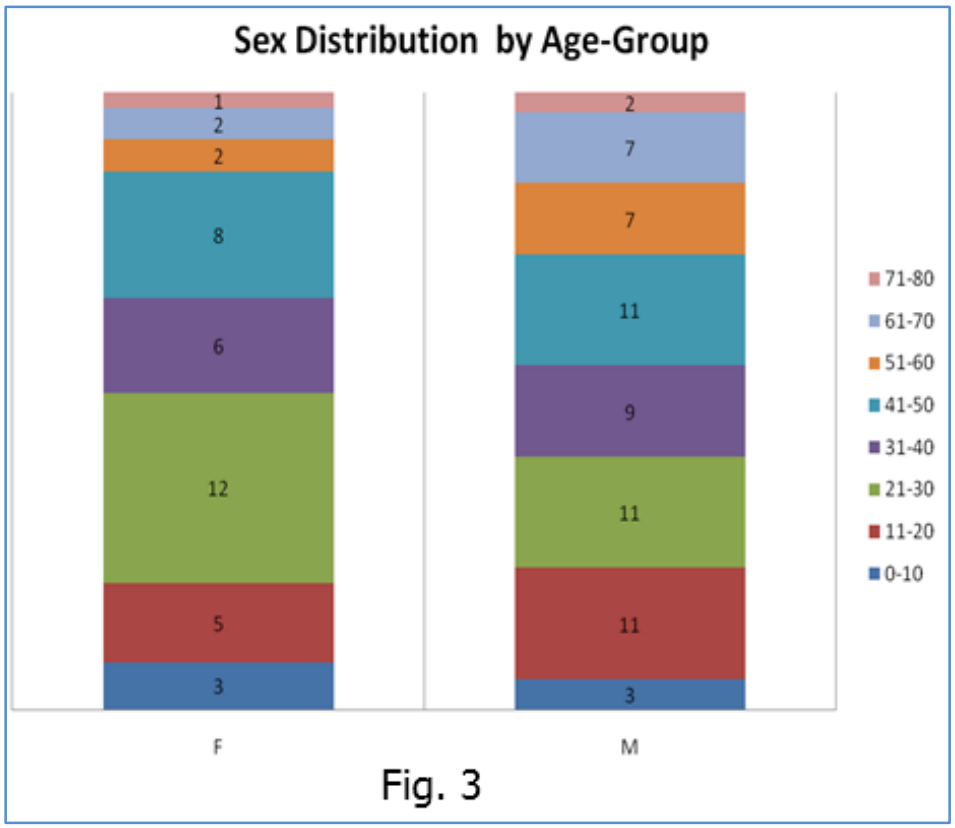

Fig. 3

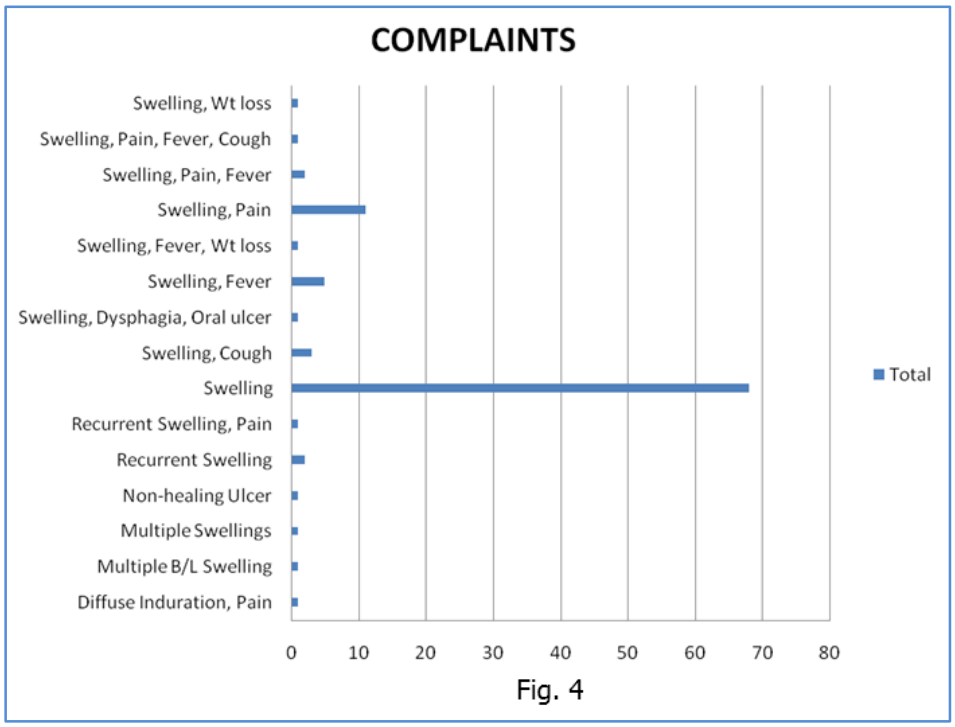

Fig. 4

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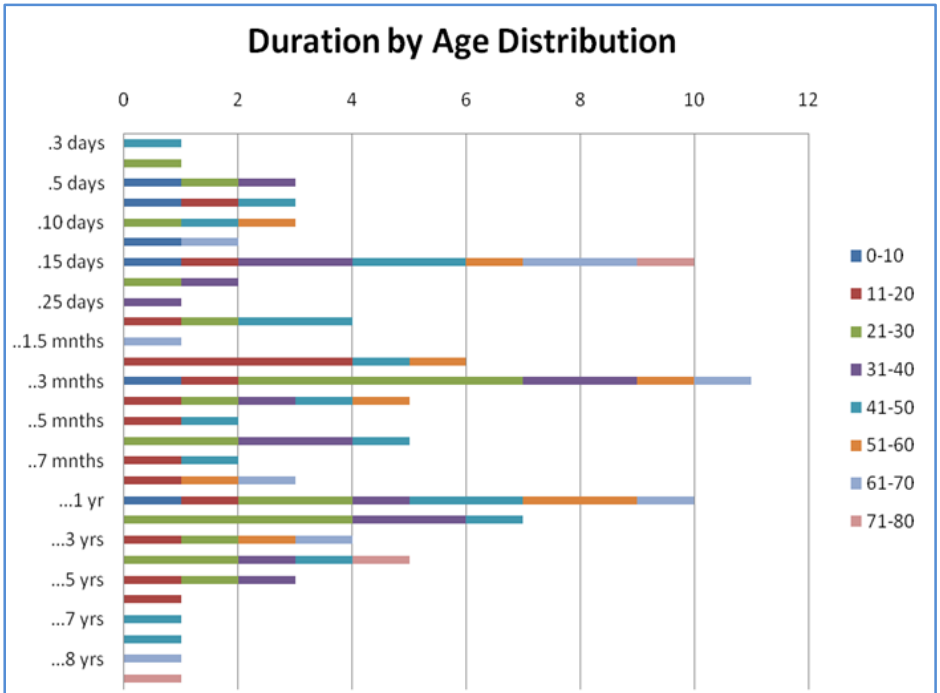

Fig. 5

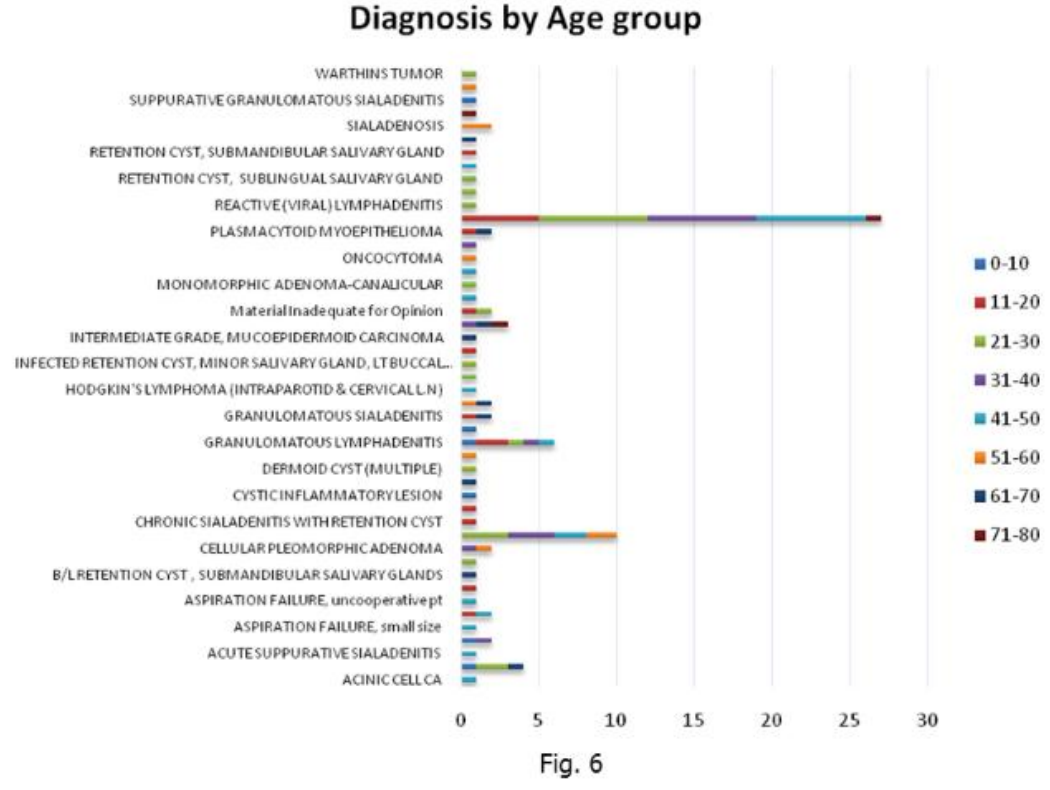

Fig. 6

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Age Range	Total	% of total	Male	% in range	Female	% in range
0-10	6	6	3	50%	3	50%
11-20	16	16	11	68.75%	5	31.25%
21-30	23	23	11	47.82%	12	52.17%
31-40	15	15	9	60%	6	40%
41-50	19	19	11	57.89%	8	42.1%
51-60	9	9	7	77.77%	2	22.22%
61-70	9	9	7	77.77%	2	22.22%
71-80	3	3	2	66.66%	1	33.33%
Total	100	100%	61		39	

Table 1: Age-Sex Distribution

Complaint
Swelling
Swelling, Pain
Swelling, Fever
Swelling, Wt loss
Swelling, Cough
Swelling, Pain, Fever
Swelling, Fever, Wt loss
Swelling, Pain, Fever, Cough
Swelling, Dysphagia, Oral ulcer
Multiple Swellings
Multiple B/L Swelling
Recurrent Swelling
Recurrent Swelling, Pain
Non-healing Ulcer
Diffuse Induration, Pain

Table 2: Presenting Complaints

Duration of Disease	1-7d	8-15d	16-30d	1-3m	3-6m	6-12m	1-5y	5-10y	>10y	Sub total
Non-neoplastic Salivary Gland Lesions	7	7	3	5	2	5	5	-	-	34
Benign Neoplastic Salivary Gland Lesions	1	4	-	6	5	5	14	2	-	37
Malignant Salivary Gland Lesions	-	-	-	2	1	3	0	2	1	9
Total	8	11	3	13	8	13	19	4	1	80

Table 3: Distribution of Duration of Symptoms

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Cytodiagnosis		No. of Cases
Aspiration Failure		4
Material Inadequate		2
Nonneoplastic Salivary Lesions ,n=34 (42.5% of total salivary lesions)	Normal Gland	1
	Sialadenosis	2
	Acute Sialadenitis	5
	Chronic Nonspecific Sialadenitis	10
	Retention Cyst	10
	Acute on Chronic Sialadenitis	2
	Chronic Sialadenitis with Retention Cyst	1
	Chronic Granulomatous Sialadenitis	3
Neoplastic Benign Salivary Gland Lesions, n=37 (46.25% of total salivary lesions)	Pleomorphic Adenoma	31
	Plasmacytoid Myoepithelioma	2
	Monomorphic Adenoma	2
	Warthin's Tumor	1
	Oncocytoma	1
Neoplastic Malignant Salivary Gland Lesions, n=9 (11.25% of total salivary lesions)	Mucoepidermoid Carcinoma	6
	Acinic Cell Carcinoma	1
	Salivary Duct Carcinoma	1
	Carcinoma ex Pleomorphic Adenoma	1
Non-neoplastic Nonsalivary Lesions	Viral Lymphadenitis	1
	Chronic Suppurative Lymphadenitis	1
	Chronic Granulomatous Lymphadenitis	9
	Dermoid Cyst	1
Neoplastic Nonsalivary Gland Lesions	Hodgkins Lymphoma	1
	Giant Cell Tumor, Bone	1
Total		100

Table 4: Cytodiagnosis

Category	Diagnosis	No. of Cases	% of Salivary Lesions
Nonneoplastic Salivary Lesions, n=34 (42.5% of total salivary lesions)	Normal Gland	1	1.25
	Sialadenosis	2	2.5
	Acute Sialadenitis	5	6.25
	Chronic Nonspecific Sialadenitis	10	12.5
	Retention Cyst	10	12.5
	Acute on Chronic Sialadenitis	2	2.5
	Chronic Sialadenitis with Retention Cyst	1	1.25
	Chronic Granulomatous Sialadenitis	3	3.75

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Neoplastic Benign Salivary Gland Lesions, n=37 (46.25% of total salivary lesions)	Pleomorphic Adenoma	31	38.75
	Plasmacytoid Myoepithelioma	2	2.5
	Monomorphic Adenoma	2	2.5
	Warthin's Tumor	1	1.25
	Oncocytoma	1	1.25
Neoplastic Malignant Salivary Gland Lesions, n=9 (11.25% of total salivary lesions)	Mucoepidermoid Carcinoma	6	7.5
	Acinic Cell Carcinoma	1	1.25
	Salivary Duct Carcinoma	1	1.25
	Carcinoma ex Pleomorphic Adenoma	1	1.25
Total		80	

Table 5: Incidence of Salivary Gland Lesions

Age Range	**0-10 yrs**	**11-20 yrs**	**21-30 yrs**	**31-40 yrs**	**41-50 yrs**	**51-60 yrs**	**61-70 yrs**	**71-80 yrs**	**Subtotal**
Non-neoplastic Salivary Gland Lesions	4	4	8	5	5	4	3	1	34
Benign Neoplastic Salivary Gland Lesions	0	6	10	8	8	2	2	1	37
Malignant Salivary Gland Lesions	0	0	1	1	1	1	4	1	9
Total	**4**	**10**	**19**	**14**	**14**	**7**	**9**	**3**	**80**

Table 5a: Age-wise Incidence of Salivary Gland Lesions

Category	Sex	Subtotal	Total
Non-neoplastic Salivary Gland Lesions	M	21	34
	F	13	
Benign neoplastic Salivary Gland Lesions	M	22	37
	F	15	
Neoplastic Salivary Gland Lesions	M	8	9
	F	1	
Total	M	51	80
	F	29	

Table 5b: Sex-wise Incidence of Salivary Gland Lesions

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Diagnosis	Parotid	Submandibular	TM Angle	Sublingual	Minor Salivary Glands	Total
Normal Gland			1			1
Sialadenosis			2			2
Acute Sialadenitis	3	2				5
Retention Cyst	2	3		3	2	10
Chronic Nonspecific Sialadenitis	3	4	3			10
Acute-on-Chronic Sialadenitis	2					2
Chronic Sialadenitis with Retention Cyst		1				1
Chronic Granulomatous Sialadenitis	2		1			3
Pleomorphic Adenoma	18	7	5		1	31
Plasmacytoid Myoepithelioma	1	1				2
Monomorphic Adenoma	1	1				2
Warthin's Tumor	1					1
Oncocytoma			1			1
Mucoepidermoid Carcinoma	2	2	2			6
Acinic Cell Carcinoma	1					1
Salivary Duct Carcinoma	1					1
Carcinoma ex Pleomorphic Adenoma	1					1
Subtotal	38	21	15	3	3	80
% of total salivary lesions	47.5%	26.25%	18.75%	3.75%	3.75%	

Table 5c: Location-wise distribution of Salivary Gland Lesions

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