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Cytopathological study of salivary gland lesions by Fine Needle Aspiration Cytology (FNAC): A study at tertiary care hospital in Gujarat

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Abstract
Fine needle aspiration cytology (FNAC) of salivary gland lesions is an inexpensive, minimally invasive, easier to perform and outpatient diagnostic procedure helpful to clinicians for earlier diagnosis and treatment because of rapid turnaround time.
Aim and Objectives: The aim of the study is to evaluate the spectrum of salivary gland lesions diagnosed by FNAC in a tertiary care hospital in Gujarat.
Materials and Methods: An observational study was carried out over a period of one year from January 2023 to January 2024 at Narendra Modi Medical College & Sheth L.G. General Hospital, Ahmedabad. In the present study, 58 patients with suspected salivary gland lesions who underwent FNAC were included. FNAC was performed using a 22-24 gauge needle and 10 ml plastic syringe without local anaesthesia. Air dried and 95% ethanol fixed smears were stained using Giemsa stain and Papanicolaou stain / Hematoxyline & Eosin (H & E), respectively. The slides along with details of the patient were studied and findings were recorded.
Results: A total of 58 cases of salivary gland lesions were studied who underwent FNAC over a period of one year. The age of the patients ranged from 8 to 62 years with the peak age group of 21-30 years, 31-40 years and 51-60 years for non-neoplastic lesions, benign tumours and malignant tumours respectively. The male to female ratio was 1.6:1. Parotid gland involvement was most commonly noted. Benign salivary gland lesions contributed to the majority of cases (48.27%). Chronic sialadenitis was the most common diagnosis among non-neoplastic lesions (57.14%, N=12). Among total neoplastic salivary gland lesions, Pleomorphic adenoma was the most common neoplastic benign tumour (N=23, 71.87%). Mucoepidermoid carcinoma (N=32, 12.5%) was the only malignant neoplastic lesion noted among total neoplastic salivary gland lesions.
Conclusion: FNAC of salivary gland lesions is advantageous for both patients and clinicians because of rapid diagnosis, cost effectiveness and reasonable accuracy. It provides clarity for the management and prevents unnecessary surgery in cases of non-neoplastic lesions. Identification of malignant lesion helps the surgeon in determining the type and extent of operative procedure.

Keywords: Fine needle aspiration cytology, salivary gland lesions, neoplastic, non-neoplastic

Introduction
Salivary glands are the exocrine glands responsible for production and secretion of saliva and consist of the major salivary glands which include parotid, submandibular, sublingual and the minor glands that are numerous and widely distributed throughout the mouth and oropharynx [1]. Normal salivary gland FNAC comprises of ductal cells, acinar cells, myoepithelial cells with admixed fibroconnective and adipose tissue. Sometimes normal lymphoid tissue may present due to aspiration of intraparotid and periparotid lymphnodes [2].
Fine needle aspiration cytology is indicated in any space occupying lesion of the salivary glands. The patients usually present with the complaints of swelling, pain, redness and paresthesia. The FNAC of salivary gland is especially helpful as incision biopsy may cause fistula formation, potential infection in the plane of surgery and facial nerve palsy. Besides that, FNAC is a rapid and safe technique and devoid of any serious complications [3, 4, 5]. The present study aims to analyze the spectrum of salivary gland lesions by FNAC.

Materials and Methods

An observational, single hospital based study was conducted at Narendra Modi Medical College & Sheth L.G. General Hospital, Maninagar, Ahmedabad over a period of one year from January 2023 to January 2024. All the patients presented with major and minor salivary gland lesions who underwent FNAC were taken in to account for the study population. All the patients with neck swelling other than salivary gland lesions were excluded. Follow up cases were also excluded from the study population.

A detailed history was taken and relevant clinical examination was done in all cases. All the patients were explained about the procedure and informed consent was taken. The characteristics of swelling with respect to size, consistency, fixity and overlying skin condition were noted. A 22-24 gauge needle and 10 ml plastic syringe were used for the procedure. Proper aseptic and antiseptic precautions were taken. Minimum two to three attempts were done to aspirate the lesion and the nature of aspirate was noted. A minimum of three slides prepared, one air dried slide for Giemsa stain and other two 95% ethanol fixed smears for Haematoxylin & Eosin (H & E) and Papanicolaou stain. The stained slides were mounted by DPX (Dibutylphthalate Polystyrene Xylene) and examined under light microscope. Diagnoses were rendered and data were analysed. Statistical data were expressed in proportion, ratio, mean, standard deviation and median.

Results

A total of 58 patients of salivary gland lesions were analyzed. The age of the patients ranged from 8 to 62 years with mean and median age being 34.42±13.43 and 34 years respectively. Male preponderance (N=36, 62.06%) was noted with male to female ratio being 1.6:1. Peak age group distribution was observed in 4th decade for all salivary gland lesions with the highest frequency for non-neoplastic lesions, benign tumours and malignant tumours in the 3rd, 4th and 6th decade respectively (Table 1). Parotid gland (53.44%) was the most frequently involved salivary gland followed by submandibular (34.48%), lingual (6.89%) and minor salivary glands (5.17%) (Table 5). Swelling of the affected area was the commonest clinical presentation (98.8%) followed by pain (32.4%) and fixity (28.4%).

Five cases were labelled as unsatisfactory for diagnosis because the aspirates were paucicellular and hemorrhagic. Benign salivary gland tumours contributed to the majority of cases (48.27%) followed by non-neoplastic lesions (36.20%) and malignant salivary gland tumours (6.89%) (Table 2). Chronic sialadenitis was the most common diagnosis among non-neoplastic lesions (57.14%, N=12). Majority of patients having chronic sialadenitis presented with pain during chewing (N=10, 83%) and seven (58%) out of them had history of recurrent enlargement. Smears showed clusters of ductal cells and scant acinar cells and lymphocytes along with mucinous material. Pleomorphic adenoma was the most common neoplastic lesion (N=23, 71.87%) observed in present study. Out of twenty three cases, eighteen cases showed involvement of parotid gland while five cases showed submandibular gland involvement. Majority of patients presented with painless mass. Four cases of mucoepidermoid carcinoma of salivary glands were observed in present study out of which three cases were from parotid gland and one case was from submandibular salivary gland. All of them presented with complaint of painless mass which were firm and fixed.

Discussion

The present study highlights the role of FNAC as a safe and minimally invasive procedure for diagnosis of salivary gland lesions within few hours. Adequate sampling, high quality smear preparation, staining and experienced cytopathologist can diagnose majority of salivary gland lesions with high accuracy. Although management of almost all neoplastic salivary gland lesions is surgical excision, a pre-operative diagnosis of benign or malignant lesion assists the clinician in deciding the extent of the surgical procedure [4].

Common age group affected in benign salivary gland tumour was 31 to 40 years which was in concordance with studies conducted by Roma *et al.* [6] and Desai P *et al.* [7]. In the study conducted by Vaishali *et al.* [8], the most common age group affected by benign salivary gland tumour was 21-30 years. The most common age group observed in malignant salivary gland lesions was 51-60 years in the present study which was similar to the study conducted by Roma *et al.* [6] and Vaishali *et al.* (8) while in the study of Junnudevi *et al.* [9], it was 61 to 70 years. The earlier presentation in the present study may be due to different geographical factors or may be due to health awareness. Common age group involved in non-neoplastic lesions was 21-30 years which was in concordance with the studies done by Roma *et al.* [6], Desai P *et al.* [7], Vaishali *et al.* (8) and Junnudevi *et al.* [9].

The overall male to female ratio was 1.6:1 which was in concordance with Desai P *et al.* [7] and Junnudevi *et al.* [9]. However, the study of Roma *et al.* [6] showed slight female preponderance. This might be due to higher number of cases of pleomorphic adenoma (N=65) in their study as pleomorphic adenoma has female preponderance [10].

In the present study, parotid gland was the most frequently involved gland followed by submandibular, sublingual and minor salivary glands, this is consistent with the studies done by Roma *et al.* [6], Desai P *et al.* [7], Vaishali *et al.* [8] and Junnudevi *et al.* [9]. The most common benign neoplasm found was pleomorphic adenoma in present study which was consistent with the studies done by Roma *et al.* (6), Desai P *et al.* [7], Vaishali *et al.* [8] and Junnudevi *et al.* (9). Pleomorphic adenoma is the most common neoplasm of the salivary gland which represents 60% of all tumours of the salivary gland. About 80% cases of pleomorphic adenoma develop in parotid gland, 10% in submandibular gland and the rest 10% cases in the paranasal sinus, oral cavity, upper respiratory tract and skin [10].

In the present study, we had reported lower incidence of malignant neoplasms. However study conducted by Desai P *et al.* [7] and Junnudevi *et al.* [9] revealed higher number of malignant neoplasm cases. This might be due to smaller sample size of present study.

In the present study, adenoid cystic carcinoma was not observed. However one case of pleomorphic adenoma turned out to be adenoid cystic carcinoma on subsequent histopathological examination. This might be due to misinterpretation of magenta coloured material as chondromyxoid stroma.

In the present study, five cases were labelled as unsatisfactory for diagnosis because of paucicellular and haemorrhagic aspirate due to small sized/cystic lesion.

Table 1: Age wise distribution of the salivary gland lesions (age in years)

Lesions	<10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	>60 years
Chronic Sialadenitis	0	02	07	03	0	0	0
Acute Sialadenitis	01	01	01	0	0	0	0
Abscess	0	0	01	0	0	0	0
Mucus Retention cyst	01	02	01	0	0	0	0
Granulomatous Sialadenitis	0	0	01	0	0	0	0
Pleomorphic Adenoma	0	01	02	10	08	02	0
Warthin's Tumor	0	0	0	02	01	01	01
Mucoepidermoid Carcinoma	0	0	0	0	01	02	01

Table 2: Distribution of salivary gland lesions (N=58)

Lesions	Number of cases	Percentage (%)
Non Diagnostic	05	8.62%
Non-Neoplastic	21	36.20%
Benign	28	48.27%
Malignant	04	6.89%
Total	58	100%

Table 3: Distribution of various non-neoplastic salivary gland lesions (N=21)

Lesions	Number of cases	Percentage (%)
Chronic Sialadenitis	12	57.14%
Acute Sialadenitis	03	14.28%
Abscess	01	4.76%
Mucus Retention cyst	04	19.04%
Granulomatous Sialadenitis	01	4.76%
Total	21	100%

Table 4: Distribution of neoplastic salivary gland lesions (N=32)

Lesions		Number of cases	Percentage (%)
Benign (N=28;48.27%)	1. Pleomorphic Adenoma	23	71.87%
	2. Warthin's Tumor	05	15.62%
Malignant (N=4; 6.89%)	3. Mucoepidermoid Carcinoma	04	12.5%
Total		32	100%

Table 5: Distribution of involved salivary glands

Type of salivary gland involved	Number of Cases
Parotid	31(53.44%)
Submandibular	20(34.48%)
Lingual	04(6.89%)
Minor salivary glands/ Other	03(5.17%)

Conclusion

FNAC of salivary gland lesions is advantageous for both patients and clinicians because of rapid diagnosis, cost effectiveness and accuracy. It helps to differentiate neoplastic from non-neoplastic lesions significantly. In the case of a non-neoplastic inflammatory lesion, a conservative treatment may be useful. It also provides us valuable information regarding benign or malignant nature of neoplastic lesion for planning of subsequent therapeutic management and avoiding unwanted surgeries.

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Conflict of Interest:

Not available

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