



ACCURACY AND ROLE OF FNAC IN THE DIAGNOSIS OF SALIVARY GLAND SWELLINGS

Sudha Jain	Associate Professor, Pathology, Surat Municipal Institute of Medical Education & Research, (SMIMER), Surat
Hardik Sheladiya*	Resident, Pathology, Surat Municipal Institute of Medical Education & Research, (SMIMER), Surat *Corresponding Author
Gunjan Jain	Resident, Pediatrics, Govt, Medical College, , Surat ,
Amee Patel	Resident, Deptt of Haemato- Oncology, BLK Super speciality hospital, New Delhi

ABSTRACT **Objectives:** The aim of this study was to evaluate the diagnostic accuracy and efficacy of Fine Needle Aspiration Cytology (FNAC) in various salivary gland swellings.

Materials and methods: This retrospective study was performed in Department of Pathology, SMIMER, Surat, Gujarat from July 2014 – December 2017. During this period a total of 4372 FNAC's were done out of which 110 FNAC's were on salivary gland swellings. Correlation was done between cytological smear slides and biopsy slides whenever available.

Results: In this series of FNAC, 51 cases (46.36%) were benign neoplasm, 16 cases (14.54%) malignant neoplasm, non-neoplastic lesion 11 cases (14.54%) and inflammatory lesions 20 cases (18.18%) and non-conclusive seen in 12(10.90%) cases. Histopathology was available in 32 cases out of which 30 cases correlated with cytology. There were no false positive reports but false negative result was seen in two cases.

Conclusion: FNAC is useful in the diagnosis of salivary gland swellings with a sensitivity of 94.12% and specificity of 100%. The sensitivity, specificity, predictive value of the positive test and predictive value of the negative and false negative test for salivary gland malignant lesion which were being detected were 94.12%, 100%, 100%, 93.75% and 7.14%, respectively. There were no false positives.

KEYWORDS : Fine needle aspiration cytology (FNAC); Salivary gland swelling (SGS).

INTRODUCTION

There are three pairs of major salivary glands, namely parotid, submandibular and sublingual glands. In addition, there are hundreds of minor salivary glands situated in the mucosal lining of the upper aero digestive tract. Salivary gland diseases usually present as a swelling of the affected gland. The differential diagnosis between benign and malignant lesions cannot be established by the simple clinical or radiologic features so FNAC is being increasingly used in the differential diagnosis of the Salivary Gland Swellings (SGS). FNAC is a minimally invasive procedure that does not require anaesthesia. It is well-tolerated, simple, safe and cost-effective. Moreover, it can be easily repeated in the event of non-diagnostic results, thus improving diagnostic precision.

Still the role of FNAC in the pre-operative evaluation is not universally established. At present, the debate focuses on the reliability of FNAC as a diagnostic tool and its usefulness in treatment planning.

Aims and objectives

1. To evaluate the diagnostic accuracy and efficacy by FNAC in various salivary gland swellings.
2. To correlate the FNAC diagnosis with histopathology.

Materials and methods

This is a retrospective study performed at SMIMER, a tertiary care centre over a period from July 2014 - December 2017. During this period a total of 4372 FNAC's were done out of which 110 FNAC's were on salivary gland swellings. Relevant clinical details were elicited in all the cases and findings of local examination noted. All the patients underwent FNAC, which was performed using 23 G needle with suction provided by 10 ml syringe. The character of aspirate was noted, routine smears prepared & after fixation stained with Haematoxylin and Eosin (H & E), Giemsa and Papanicolaou stain. Following the cytological diagnosis, patients underwent appropriate surgical procedure and specimen submitted for histopathologic diagnosis.

Results

In our study Salivary gland swelling for FNAC were seen in 2.5% of cases. Sex distribution showed 67 (60.90%) male patients and 43 (39.10%) female patients. In this series of FNAC, 51 cases (46.36%) were benign neoplasms, 16 cases (14.54%) malignant neoplasms, inflammatory lesions 20 cases (18.18%), non-neoplastic lesion 11

cases (10%) and non-diagnostic in 12(10.90%). Histopathology was available in 32 cases out of which 30 cases correlated with cytology. Malignant lesions were common in more than 40 years age group with a male predominance. Mucoepidermoid carcinoma was found in eight cases followed by Adenocystic carcinoma in four cases, undifferentiated carcinoma in three cases, Metastatic SCC in one case. Benign lesions were common in 20-49 years age group with a female predominance. The commonest benign lesion was pleomorphic adenoma in 45 cases (40.90%). Histopathology was available in 32 cases out of which 30 cases correlated with cytology. There were no false positive reports but false negative result was seen in two cases. Sensitivity and specificity were found to be 94.12% and 100% respectively.

Age wise distribution of Salivary gland swelling Distribution of salivary gland swelling

Lesions	No of cases	% of cases
Benign Neoplasm	51	46.36
Malignant Neoplasm	16	14.54
Non-Neoplastic Lesion	11	10
Inflammatory Lesion	20	18.18
Non diagnostic	12	10.90
Total	110	100

AGE GROUP	MALE		FEMALE		TOTAL	
	NO.	NO.	NO.	NO.	NO.	%
<10	3	1	4			3.63
10-19	6	3	9			8.18
20-29	14	9	23			20.90
30-39	11	13	24			21.81
40-49	9	8	17			15.45
50-59	17	7	24			21.81
>60	7	2	9			8.18
TOTAL	67	43	110			100

Distribution of Benign Tumours on FNAC Distribution of malignant tumours on FNAC

Lesions	No of cases	% of cases
Pleomorphic adenoma	45	40.90
Warthin's tumour	4	3.63
Oncocytoma	1	0.9

Nodular Oncocytic Hyperplasia	1	0.9
Total	51	46.36

Lesions	No of cases	% of cases
Mucoepidermoid carcinoma	8	7.27
Adenoid cystic carcinoma	4	3.63
Undifferentiated ca	3	2.72
Metastatic Squamous cell carcinoma	1	0.9
Total	16	14.54

Distribution of non-neoplastic lesions

Lesions	No of cases	% of cases
Sialadenosis	5	4.54
Cystic Lesion	3	2.72
Lymphoepithelial cyst	3	2.72
Total	11	10

Distribution of Inflammatory Lesions

Lesions	No of cases	% of cases
Acute sialadenitis	8	7.27
Chronic sialadenitis	12	10.90
Total	20	18.18

Comparison between cytology & histopathology

Lesion	Cytology	Histology
Pleomorphic adenoma	21	19
Warthin's tumour	1	1
Mucoepidermoid carcinoma	2	2
Adenoid cystic carcinoma	1	1
Metastatic Squamous cell carcinoma	1	1
Chronic sialadenitis	5	5
Lymphoepithelial Cyst	1	1
Total	32	30

Discussion

A salivary gland swelling can present in a variety of locations, depending on the salivary gland affected. Fine-needle aspiration cytology (FNAC) of the salivary gland is a commonly accepted, sensitive and specific technique to determine the nature of the lesion (inflammatory/ neoplastic – benign or malignant). It is widely used, safe and less traumatic diagnostic procedure capable of providing important information to the treating physician

The most common age group of Salivary gland swellings was 21-40 years (42.71%) followed by 41-60 years (37.26%). The occurrence of salivary gland tumour increases with age, H Keun4 et al also found in his study.

In this study the commonest benign lesion was pleomorphic adenoma (40.90%) followed by Warthin's tumour (3.63%), oncocytoma (0.9%) and nodular oncocytic hyperplasia (0.9%). S. Elagoz5 et al found pleomorphic adenoma (45%) followed by Warthin's tumour (9%). This study shows mucoepidermoid carcinoma is the commonest malignancy (8 cases) followed by adenoid cystic carcinoma (3 cases) and undifferentiated and Metastatic Squamous cell carcinoma each. C. J. R. Stewart6 et al found that 4 lymphomas of mucosa-associated lymphoid tissue (MALT) type, 3 adenocarcinomas, 2 squamous carcinomas, 2 adenoid cystic carcinomas, and one case each of carcinoma ex pleomorphic adenoma, undifferentiated carcinoma, and high-grade mucoepidermoid carcinoma) in his study of 341 cases.

On Fine needle aspiration cytology (FNAC) of Parotid two cases were Pleomorphic adenoma, but later on histopathologically it is diagnosed as adenoid cystic carcinoma & other was muco epidermoid carcinoma on histopathology of surgical specimen. A cellular PA, on FNAC, needs to be differentiated from monomorphic adenoma, myoepithelioma, and Acinic cell carcinoma.

Non-neoplastic lesions of the parotid are not uncommon. In our study inflammatory lesions & non neoplastic lesions were diagnosed as 20 & 11 cases respectively which included sialadenitis, retention cyst, and sialadenosis. This proportion is in accordance with the existing literature (11-66%). Z. Baren7 et al found 13 inflammatory lesions and 5 non-neoplastic cysts. Arshad8 et al found 20 inflammatory lesions

and 10 non-neoplastic cysts.

Differential diagnosis of nonneoplastic salivary lesions is required to exclude benign and malignant salivary tumours. Sialadenosis revealed only normal salivary gland parenchyma. Such an aspirate can be judged as false-negative, the diagnosis of sialadenosis should be based on clinical and cytologic correlation with reasonable follow-up of the patient.

The non diagnostic rate in the present study was 10.9%, this could be due to the complexity of the tissue architecture, which is in concordance with the 5-10% inadequacy rate reported in literature.[5,6,8] In this series of patients, fine needle aspiration was also diagnostic for parotid abscess and could exclude malignancy in parotid cysts. No complications such as haematoma, nerve injury or infection occurred following the FNAC.

Though the management of almost all neoplastic salivary gland lesions with the exception of lymphomas, is surgical excision, There are a number of reasons for this. Firstly, FNAC is not 100% accurate, and the accuracy varies according to the experience of the cytopathologist. Secondly, the commonest benign tumour is a pleomorphic adenoma which has the potential to undergo malignant transformation in a long-standing case. Thirdly, many patients may also want the tumour removed for cosmetic reasons. Despite the drawbacks, FNAC is still useful and usually forms part of the diagnostic work-up. There are 2 main reasons for this. Firstly, non-neoplastic lesions can sometimes be confidently diagnosed e.g. Sialadenosis. In these cases, surgery can be avoided altogether and patients treated accordingly. Secondly, if cytology does diagnose a malignancy, which is highly specific it helps in the surgical planning the extent of surgery and enhances better pre-operative counseling.

There were no false positive reports but false negative results were seen in 2 cases. FNAC is useful in the diagnosis of salivary gland swellings with a sensitivity of 94.12% and specificity of 100%. The sensitivity, specificity, predictive value of the positive test and predictive value of the negative and false negative test for salivary gland malignant lesion which were being detected were 94.12%, 100%, 100%, 93.75% and 7.14%, respectively. Various studies in literature have reported a diagnostic accuracy of 86-98% for cytologic diagnosis of salivary gland neoplasms. The sensitivity has ranged from 62% to 97.6% and specificity from 94.3% to 100%.[5,9,10]

Conclusion

The variety of salivary gland diseases is wide. The commonest causes include infections, duct stones and neoplasms. By taking a careful history and performing a thorough physical examination, supplemented with ultrasonography when necessary, the clinician can make an accurate diagnosis in the majority of cases. FNAC is useful in the diagnosis of salivary gland swellings especially in benign conditions with sensitivity of 94.12% and specificity of 100%.

References

- 1) Qizilbash AH, Sianos J, Young JE, Archibald SD. Fine needle aspiration biopsy cytology of major salivary glands. *Acta Cytol.* 1985;29:503-12. [PubMed]
- 2) Daneshbod Y, Khademi B. Diagnostic difficulties in the interpretation of fine needle aspirate samples in salivary lesions: Diagnostic pitfalls revisited. *Acta Cytol.* 2009;53:53-70. [PubMed]
- 3) Kocjan G, Nayagam M, Harris M. Fine needle aspiration cytology of salivary gland lesions: Advantages and pitfalls. *Cytopathology.* 1990;1:269-75. [PubMed]
- 4) Keun-H, waL, Myung-Je C, Yoshio Y et al. FNAC diagnosis of salivary gland swellings. *J Clin Pathology.* 1994;47:231-6
- 5) S. Elagoz, M. Gulluoglu, D. Y. Imazbayhan, H. Ozer, I. Arslan. The Value of Fine-Needle Aspiration Cytology in Salivary Gland Lesions, 1994-2004. *ORL J Otorhinolaryngol Relat Spec.* 2007; 69(1):51-6
- 6) Stewart CJ, MacKenzie K, McGarry GW, et al. Fine-needle aspiration cytology of salivary gland: a review of 341 cases. *Diagn Cytopathology* 2000;22:139-146.
- 7) Z. Baren P, Schar C, Hotz MA, Looshi H. Value of fine needle aspiration cytology of parotid gland masses. *Laryngoscope.* 2001;111:1989-92.
- 8) Jayaram G, Verma AK, Sood N, Khurana N. Fine needle aspiration cytology of salivary gland lesions. *J Oral Pathol Med.* 1994;23:256-61. [PubMed]
- 9) Rajwanshi A, Gupta K, Gupta N, Shukla R, Srinivasan R, Nijhawan R, et al. Fine-needle aspiration cytology of salivary glands: Diagnostic pitfalls – Revisited. *Diagn Cytopathol.* 2006;34:580-4. [PubMed]
- 10) Mihashi H, Kawahara A, Kage M, Kojiro M, Nakashima T, Umeno H, et al. Comparison of preoperative fine-needle aspiration cytology diagnosis and histopathological diagnosis of salivary gland tumors. *Kurume Med J.* 2006;53:23-7. [PubMed]