



## Clinicopathological profile of salivary gland swellings in Kumaon region of Uttarakhand

Authors

**Dr Bhawana Pant<sup>1</sup>, Dr Sanjay Gaur<sup>2</sup>, Dr Binay Kumar<sup>3</sup>, Dr Deepa Arya<sup>4</sup>**

<sup>1</sup>Associate Professor, Department of ENT, GMC Haldwani

<sup>2</sup>Associate Professor, Department of Pharmacology, GMC Haldwani

<sup>3</sup>Professor, Department of Pathology, GMC Haldwani

<sup>4</sup>Junior Resident, Department of Pathology, GMC Haldwani

Corresponding Author

**Dr Bhawana Pant**

Associate Professor, Department of ENT, GMC Haldwani

Email: [-pantbhawana4@gmail.com](mailto:-pantbhawana4@gmail.com)

### Abstract

**Aim/Objective:** *The objective of this study was to evaluate the various salivary gland lesions in Kumaon region of Uttarakhand.*

**Materials and Methods:** *A total of 200 patients with salivary gland lesions were evaluated from Jan 2008 to June 2016. FNAC was performed on these patients at department of Pathology in Government Medical college Haldwani. Patients were received from ENT, medicine and surgery departments after proper clinical, hematological and radiological evaluation. Surgically resected, formalin fixed specimen were also received, they were processed and slides were prepared. The cytological and histopathological stained slides were studied, analyzed and correlated.*

**Results:** *FNAC of 200 cases were studied and following results were observed.*

*Out of 200 patients included in the study the different categories of salivary gland lesions included benign, malignant and non neoplastic. Non neoplastic lesions constituted 103 cases (51.5%) and included conditions like acute or chronic infection, calculus and cystic lesions etc. Rest (97) were neoplastic conditions which included benign and malignant lesions. Benign lesions constituted 69 cases (34.5%) while malignant lesions seen in 28 cases (14%). Parotid was the most common major salivary gland to be involved (57%). Out of 97 cases cyto-histological correlation could be done in only 60 cases. Only 50 cases were correctly diagnosed. 10 cases had no correlation between cytology and histopathological finding. In the present study sensitivity of FNAC for diagnosis of malignant lesions was 85%, specificity of 93.02%, negative predictive value of 93.02%, positive predictive value of 85% and diagnostic accuracy of 83.33%.*

**Conclusion:** *FNAC of the salivary gland is a safe and reliable technique in the primary diagnosis of salivary gland lesions. Although it has a high diagnostic accuracy, rate of characterization of specific type of tumor is low due to variable cytomorphology. In such cases, histopathological examination may prove to be accurate for diagnosis.*

## Introduction

Salivary glands are exocrine glands located in head and neck region and consists of major glands like parotid, submandibular, sublingual and minor salivary glands which are distributed throughout mouth and oropharynx. Tumours originating from these glands comprise 6% of all head and neck neoplasms<sup>1</sup>

Fine needle aspiration cytology (FNAC) is an important and useful tool in diagnosis of salivary gland lesions. It has established its superior role over various types of biopsies like incision biopsy, frozen biopsy etc<sup>2</sup>. Most of the salivary gland lesions are benign in nature carcinoma being uncommon. Salivary gland neoplasms have some properties which make them different from other head and neck neoplasms. They possess diverse histological patterns which makes distinction between benign and malignant tumours difficult merely on the basis of FNAC thus at times leading to unsatisfactory reporting<sup>3</sup>

## Material and methods

This study was carried out at Government medical college Haldwani which is a tertiary care centre in the state of Uttarakhand. The department of pathology received patients from outdoor as well as indoor departments of ENT, Surgery and medicine. Study was carried out retrospectively over a period of 8 years during January 2008-June 2016 where FNAC reports of salivary gland lesions were analysed and sensitivity, specificity, accuracy and cytopathological correlation of salivary gland masses was calculated. Paediatric population was not included in the study. Total 200 patients were included in the study. All cases were evaluated clinically followed by hematological and radiological investigation. Informed consent was taken from patient, then swelling was palpated and fixed, under aseptic precautions, FNAC was done from different sites of salivary gland using a 10 cc syringe with a 23 gauge needle. The material was aspirated and smeared onto clean glass slides. FNA dried smears were stained with MGG (May Grunwald's

Giemsa) stain and wet smears fixed in methanol were stained with papaniculau stain and H&E (haematoxylin and eosin) respectively. Paraffin embedded tissue sections obtained from salivary gland were stained with haematoxylin and eosin and few special stains were performed if required. All lesions were studied under three categories which included benign, malignant and non neoplastic.

## Results

Out of 200 patients included in the study the different categories of salivary gland lesions included benign, malignant and non neoplastic. The male to female ratio was 2:3 and mean age of involvement was 37 years. Non neoplastic lesions constituted 103 cases (51.5%) and included conditions like acute or chronic infection, calculus and cystic lesions etc. Rest (97) were neoplastic conditions which included benign and malignant lesions. Benign lesions constituted 69 cases (34.5%) while malignant lesions seen in 28 cases (14%). In benign category maximum lesions were seen in 20-40 years while malignant tumours were observed in 50-60 years of age group. In non neoplastic category maximum patients were seen in 40-60 years age group.

Parotid was the most common major salivary gland to be involved as 114 (57%) cases out of total 200 cases were detected in this study. Rest were submandibular gland lesions 85 (42.5%) and 1 (0.5%) case involved minor salivary glands from soft palate. Pleomorphic adenoma was the commonest tumour as 50 cases (51.54%) out of 97 patients presenting with neoplasms were detected with this variant. It was followed by 24 (24.74%) cases of mucoepidermoid carcinoma. 10 cases of Warthin tumour were detected which constituted 10.3% of all tumours. 4 cases of basal cell adenoma were seen. 4 cases of lymphoepithelial cyst 2 each from parotid and submandibular gland respectively were found in this study. We could find single case of acinic cell carcinoma in our study. 2 patients had metastatic lesions from other parts of body. (table no.1)

Hemangioma is very common in parotid but we could see only 2 cases .Out of 97 cases cyto-histological correlation could be done in only 60 cases. Only 50 cases were correctly diagnosed. 10 cases had no correlation between cytology and histopathological finding. Of these 10 cases 4 patients who were diagnosed as pleomorphic adenoma on cytological examination turned out be low grade mucoepidermoid carcinoma after complete excision of tumour. Two cases having

cystic lesion in parotid came out to be normal gland on histopathological examination. One case of hemangioma was operated which came out to be A-V malformation with intraendothelial hyperplasia. In the present study sensitivity of FNAC for diagnosis of malignant lesions was 85%, specificity of 93.02% , negative predictive value of 93.02%, positive predictive value of 85% and diagnostic accuracy of 83.33%.

**Table no.1** Showing different types of neoplastic salivary gland lesions.

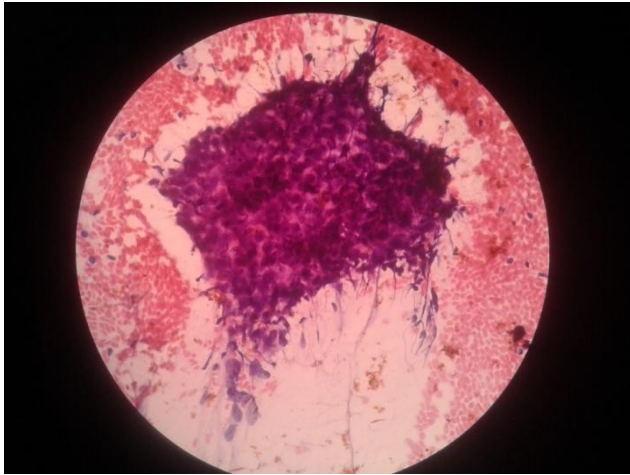
S NO.	Type of tumour	No. of cases
1	Pleomorphic adenoma	50 (51.54%)
2	Mucoepidermoid carcinoma	24 (24.74%)
3	Warthin ‘s tumour	10 (10.3%)
4	Basal cell adenoma	4 (3.6%)
5	Acinic cell carcinoma	1 (0.91%)
6	Lymphoepithelial cyst	4 (3.66%)
7	Metastatic from other site	2(1.83%)
8	Hemangioma	2(2.75%)
	Total	97

**Table no.2** Showing different types of non neoplastic salivary gland lesions

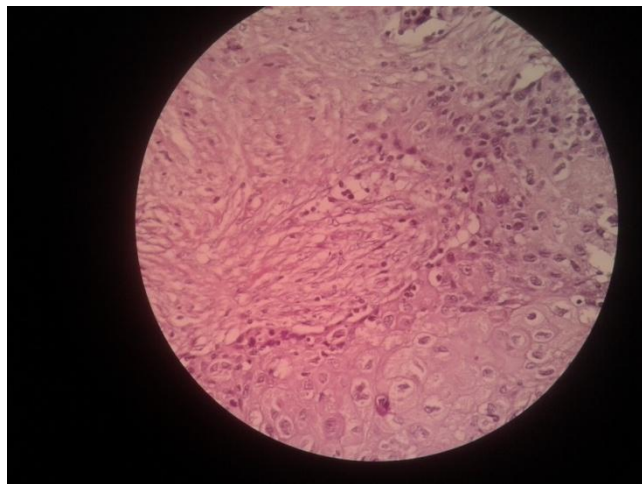
Cytological diagnosis		No.of cases
Sialadonosis		45
Sialadonosis with salidinitis with cystic changes		1
Salidinitis	Acute	7
	Sub acute	1
	Chronic	39
	Acute on chronic	1
	Necrotizing	1
	granulomatous with cystic degeneration	1
	Acute suppurative	1
	Infective	1
Non spec. infective pathology		1
suppura lesion parotid		2
Parotiditis		1
Ductal epithelium only		1
Total		103

**Table no.3 :** Cytohistological correlation of present study with other studies

	No. of cases	Sensitivity	Specificity	Diagnostic accuracy
Jayaram [18]	53	90%	95%	73.6%
Stow [19]	104	86.95%	92.3%	92.3%
Rehman [20]	50	78%	53.28%	88.57%
Lukas [21]	107	89.2%	85%	97.2%
Piccioni [22]	176	81%	99%	97%
Present study	60	85%	93.02%	83.33%



**FIGURE 1:** Cytology of mucoepidermoid carcinoma -high grade showing loosely cohesive sheets, papillaroid clusters and groups of malignant cells on hemorrhagic background (PAP X400)



**FIGURE 2:** Histology of mucoepidermoid carcinoma high grade showing irregular islands of tumour cells composed of largely squamoid cells intermingled with few intermediate cells and clear cells infiltrating the surrounding fibrous stroma (H & E X400)

### Discussion

Although FNAC is a safe diagnostic tool in head and neck swellings but as far as salivary gland lesions are concerned it is not free of controversy specially in cases of benign tumours like pleomorphic adenoma. Problem can be on both levels i.e. sampling error as well as interpretation at the level of cytopathologist. There are several benign malignant look alike tumours such as basal cell adenoma and adenoid cystic carcinoma that can be confused on FNAC.<sup>4</sup> Malignant tumours

can also be easily confused with benign tumours hence FNAC report should always be studied correlating clinical and radiological findings with other investigations. A study was conducted by Peter A. Brennan et al in 2008 to study the value of repeat FNAC in suspected salivary gland tumours when despite having adequate material for interpretation, a cytological diagnosis was not possible.<sup>5</sup> They also proposed ultrasound guided aspiration in certain cases to improve the diagnostic accuracy<sup>6</sup>. Repeated aspirations from different parts of gland and liberal sampling can improve results. Sometimes inflammatory lesions of parotid may mimic epithelial malignant tumours as desquamated epithelial cells are commonly seen in these cases and may produce diagnostic confusion<sup>7</sup>. In our study cases where repeat FNAC was required image guided aspiration was done. FNAC may not be diagnostic in cases of lymphoma where we require help of other ancillary investigations like hematological tests, radiological studies like ultrasound or MRI etc<sup>8</sup>. Core biopsy by 18 gauge needle is another option but it causes more morbidity however it increases the sensitivity.<sup>9</sup>

In cases of malignancy like carcinoma ex pleomorphic adenoma chances of false negative are there as heterogeneity plays an important role in these tumours.<sup>10</sup> Studies done in past also reveal good sensitivity in cases of metastatic lesions as metastatic cells can easily be identified as compared to their other cell variants<sup>11</sup>. Various studies done in past have reported a diagnostic accuracy of 86-98% for cytological diagnosis of salivary gland neoplasms. The sensitivity has ranged from 62% to 97.6% and specificity from 94.3% to 100%.<sup>12,13</sup> More recently one of the study showed the sensitivity of FNAC for diagnosis of malignant salivary gland lesions was 88.2% with extremely low cyto-histological type agreement rate of 30%.<sup>14</sup> Another study reported sensitivity for diagnosis of malignant lesions as 77.77%, specificity of 98.78% and positive predictive value of 93.33%.<sup>15</sup> In the present study sensitivity of FNAC for diagnosis of malignant

lesions was 85%, specificity of 93.02%, negative predictive value of 93.02%, positive predictive value of 85% and diagnostic accuracy of 83.33% which is comparable with above mentioned studies.

### Conclusion

Salivary gland lesions are commonly seen in clinical settings. FNAC is a highly reliable cost effective technique for evaluation of salivary gland lesions in hands of experienced pathologists. An accurate cytological diagnosis can avoid unwarranted surgery. Due to the minimally invasive nature of this technique, FNAC offers valuable information can be utilized along with radiological findings for planning of subsequent therapeutic management. It can also act as screening test for malignant salivary gland tumours however, there still remain few cases that may be inaccurately diagnosed on cytology due to overlapping features and in these cases histopathology is the gold standard for final diagnosis.

### References

1. L.Barnes, J.W. Eveson, P. Reichart, and D. Sidransky, pathology and genetics of head and neck tumours, P. Kleihues, and L.H Sobin, Eds, p.210, IARS, Press, Lyon, France, 2005
2. Kotwal M, Gaikwad S, Patil, Munshi M. FNAC of salivary gland – a useful tool in preoperative diagnosis or a cytopathologist's riddle? *Journal of Cytology* 2007;24(2):85-88
3. Sheahan Patrick, Shaha R Ashok. Salivary gland tumours tell and Maran's Text book of Head and Neck Surgery and Oncology 5<sup>TH</sup> edition page no. 714
4. Stanley MW. Selected problems in fine needle aspiration of head and neck masses. *Mod pathol* 2002;15:342-50
5. Petr A Brennan, Benedict Davies, David Poller, Zoe Mead, Duncan Bayne, Roberto Puxeddu, Rachel S. Oeppen. Fine needle aspiration cytology of salivary gland tumours : repeat aspiration provides further information in cases with an unclear initial cytological diagnosis *Br J Oral Maxillofac Surg* (2009), doi:10.1016/j.bjoms.2008.12.014
6. Pollar DN, Stelow E, Yiangou C. Thyroid FNAC Cytology: can we do it better? *Cytopathology* 2008;19:4-10
7. Lee SS, Cho KJ, Jang JJ, Ham EK. Differential diagnosis of Adenoidcystic carcinoma from Pleomorphic adenoma of salivary gland on fine needle aspiration cytology. *Acta Cytol* 1996;40:1246-52
8. Chhieng DC, Cangiarell JF, Cohen JM. Fine needle aspiration cytology of lymphoproliferative lesions involving major salivary glands. *Am J Clin Pathol* 2000;113:563-71
9. supriya M, Denholm S, Palmer T. Seeding of tumour cells after Fine needle aspiration cytology in benign parotid tumour: a case report and literature review. *Laryngoscope* 2008;118:163-5
10. Zhang C, Cohen JM, Cangiarell F, Waisman J, McKenna BJ, Chhieng DC. Fine needle aspiration cytology of secondary neoplasms involving the salivary glands. A report of 36 cases. *Am J Clin Pathol* 2000;113:21-8
11. Kocjan G, Nayagam M, Harris M. Fine needle aspiration cytology of salivary gland lesions: Advantages and pitfalls. *Cytopathology*. 1990;1:269-75.
12. 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]
13. Chakrabarti S, Bera M, Bhattacharya PK, Chakrabarty D, Manna AK, Pathak S, et al. Study of salivary gland lesions with fine needle aspiration cytology and

histopathology along with immunohistochemistry. J Indian Med Assoc. 2010;108:833–6. [PubMed]

14. Ashraf A, Shaikh AS, Kamal F, Sarfraz R, Bukhari MH. Diagnostic reliability of FNAC for salivary gland swellings: A comparative study. Diagn Cytopathol. 2010;38:499–504. [PubMed]