

Original Research Article

DOI: <http://dx.doi.org/10.18203/issn.2454-5929.ijohns20190774>

Study and correlation of clinical, cytological and histopathological findings in diagnosis of parotid gland masses

Angshuman Dutta^{1*}, Sweekritha Bhat¹, Debmita Dutta², Pragya Sharma³, Shikha Gianchand¹

¹Department of ENT & Head and Neck Surgery, ³Department of Pathology, Command Hospital Air Force, Bangalore, Karnataka, India

²Lab Medicine, Private practice, Bangalore, Karnataka, India

Received: 22 November 2018

Revised: 03 January 2019

Accepted: 07 January 2019

*Correspondence:

Dr. Angshuman Dutta,

E-mail: duttaangshuman@rediffmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Parotid masses comprise a variety of benign and malignant tumors and tumor-like conditions, which may present diagnostic challenges to the surgeon and pathologist as well. Fine needle aspiration cytology is considered to be a useful diagnostic tool used for preoperative evaluation of parotid masses. However its role may not be conclusive for evaluation. This study was aimed to evaluate fine-needle aspiration cytology in the diagnosis and management of parotid lesions.

Methods: The present study was a prospective study done over a 3 year period included 38 patients with parotid gland lesions who underwent preoperative fine-needle aspiration cytology, MRI/USG followed by surgical procedure and histopathological examination. The clinical, cytological findings were compared with the final histological diagnosis and concordance assessed.

Results: Of the 38 cases with parotid lesions 31(81.5%) were neoplasms and 7 (18.4%) were non-neoplastic lesions. Out of the neoplasms, 25 (80%) were benign and 6 (19%) were malignant parotid tumors. Deep lobe lesions were 9 (23.6%) and superficial lobe were 29 (76.31%). In this study correlation between FNAC and final histopathology was studied. In some situations cytological features could not provide correct tumor characterization. In our study the sensitivity of FNAC in diagnosing the lesion was 96.55% and specificity was 66.6%.

Conclusions: FNAC is a simple and reliable technique for preoperative evaluation of parotid masses. Due to the minimally invasive nature of the technique, fine-needle aspiration cytology offers valuable information for planning of subsequent therapeutic management.

Keywords: Fine-needle aspiration cytology, Parotid, Histopathology

INTRODUCTION

Salivary gland tumors are relatively rare and represent approximately 3-6% of head and neck tumors.¹ The frequency of malignant salivary neoplasms ranges from 0.4-2.6 cases per 100,000 population.¹ Among the salivary gland masses 80% involve the parotid gland and 80% of them are benign.² FNAC plays an important role

in the diagnosis of these masses. However histopathology remains the gold standard for the diagnosis of these lesions.

Aims of the present study were to correlate the FNAC diagnosis of parotid gland masses with histopathology and to find out the sensitivity and specificity of FNAC in parotid gland masses.

METHODS

Study design

A prospective study carried out at Command Hospital Bangalore.

Sample size: 38 patients.

Study period: From 01 January 2014 to 30 September 2018.

Inclusion criteria: All patients undergoing surgery parotidectomy.

Exclusion criteria: The patients with the following were excluded that acute inflammatory lesions, frank pus obtained on FNAC, revision surgeries.

FNAC was carried out as per standard guidelines in all cases. USG parotid/MRI was done in all cases. Histopathology reports were compared to FNAC. The results were statistically analysed.

RESULTS

The study included 38 patients between ages 28 and 72 years. The male to female ratio was 1:3. Average age of presentation was 48 years.

Clinical findings

28 patients had swelling on right side, 8 on left side and 1 had bilateral tumor. Facial nerve was involved in 2 of the cases.

Table 1: Distribution of disease on histopathology in parotid gland.

	Superficial lobe lesions	Deep lobe lesions	Total
Benign	24	8	32
Malignant	5	1	6

Of the parotid gland lesions (38), 31 (81.5%) were neoplasms and 7 (18.4%) were non-neoplastic lesions. Out of neoplasms, 25 (80.64%) were benign and 6 (19.3%) were malignant tumors. Deep lobe masses were 9 (23.6%) and superficial lobe lesions were 29 (76.3%). In the deep lobe most of the masses were benign 8 and only 1 was malignant. In the superficial lobe 5 masses were malignant and 24 benign.

On statistical analysis sensitivity was 96.55%, Specificity was 66.6%.

Positive predictive value was 90.3%, negative predictive value was 85.7%.

Pleomorphic adenoma was the most common in benign tumor group (15 cases), followed by Warthin's tumor (3 cases). Of the benign parotid gland lesions (inflammatory lesions and benign tumors), cytological features were concordant with histological result in 25 out of 32 cases (78%). For the remaining 7 cases (21.8%) cytological smears could only describe the cellular populations which were suggestive of benign entities (Table 1). In the malignant parotid gland lesions cytological feature was concordant with histological features in all 6 cases (100%). 2 cases of pleomorphic adenoma were also given a differential diagnosis of low grade mucoepidermoid carcinoma on FNAC however the histopathological diagnosis was pleomorphic adenoma.

Table 2: Cytohistological correlation in parotid lesions.

FNAC diagnosis	No. of cases	Histopathological diagnosis	No. of cases	Concordant cytology	Discordant cytology
Adenolymphoma	5	Adenolymphoma	3	3	2
		Parotid cyst	1		
		Lymphoepithelial sialadenitis	1		
Cyst parotid	2	Cyst	1	1	1
		Atypical pleomorphic adenoma	1		
Pleomorphic adenoma	16	Pleomorphic adenoma	14	14	2
		Oncocytoma	1		
		Sialadenosis	1		
Chronic sialadenitis	1	Sialadenitis	1	1	
Basal cell adenoma	1	Basal cell adenoma	1	1	
Oncocytoma	3	Oncocytoma	3	3	
Adenoid cystic carcinoma	2	Adenoid cystic CA	2	2	
Mucoepidermoid carcinoma	3	Mucoepidermoid CA	3	3	
Acinic cell carcinoma	1	Acinic cell carcinoma	1	1	
Inconclusive	2	Necrotising granulomatous lymphadenitis	1	2	2
		Granulomatous lymphadenitis	1		
Lymphadenitis	2	Lymphadenitis	2	2	

USG parotid was done in all cases. MRI was done in all deep lobe tumors, all malignant neoplasms and inconclusive cases.

Type of surgery done was superficial /total parotidectomy for benign lesions depending on involvement of superficial or deep lobe and total parotidectomy for all malignant neoplasms with selective neck dissection levels II to V. Facial nerve was found to be involved in 2 cases of adenoid cystic carcinoma and had to be sacrificed. 2 cases of granulomatous lymphadenitis of parotid were found to be TB PCR positive and treated with Antitubercular therapy.

DISCUSSION

Fine-needle aspiration technique is used as an important diagnostic tool in the management of various head and neck lesions.³ The complex histology of parotid gland makes cytology reporting challenging and hence needs expertise in the field. Also these tumors are relatively rare making it more difficult for the pathologist to acquire diagnostic expertise. Fine needle aspiration cytology has been considered as a useful preoperative step in the assessment of parotid gland lesions, but others believe that the method has limited clinical application because of the false-positive and false-negative rate. However, preoperative cytological evaluation has a great importance in diagnosis and differentiation of benign from malignant lesions.³

In our study, benign tumor entity with the highest frequency was pleomorphic adenoma. Cyto-histologic correlation for pleomorphic adenoma diagnosis was obtained in 14 out of 16 of cases which was similar to previous studies.^{4,5} The sensitivity of diagnosing Pleomorphic adenoma by FNAC is up to 94% in various studies.^{6,7} In 2 cases of pleomorphic adenoma in our study a differential diagnosis of low grade mucoepidermoid carcinoma was entertained. In low grade mucoepidermoid carcinomas where thick mucinous liquid is seen in the background with a paucicellular smear these tumors can be mistakenly be reported as benign lesions.⁸

False-negative and false-positive results occur in salivary gland FNAC. False-negative results are due to mainly of errors of under diagnosing low-grade tumors because of their bland cytologic features and the difficult evaluation of hypocellular cystic lesions so common in this area, while false-positive diagnoses emanate due to over reporting of reactive changes, such as occur in the setting of associated inflammatory reactions. In view of the considerable false-negative rate, FNAC cannot formally exclude malignancy and therefore cannot be reliable.⁹ Various clinical trials reported a rate of false-negative cytological diagnosis of between 0 and 37%.^{4,5} Our study had a false negative rate of 2.6% (1 case of cyst parotid).

The sensitivity of fine-needle aspiration cytology in our studied group was 96.55% with specificity 66.6% owing

to large number of false positives (2 cases of adenolymphoma, 1 case of pleomorphic adenoma). The positive predictive value was 90.3% and the negative predictive value was 85.7%. Numerous studies have reported the accuracy of cytological diagnosis of salivary gland neoplasms as being 86-98%.^{4,5,10,11} The sensitivity has ranged from 62-97.6% and specificity from 94.3% to 100%.

Zbaren et al performed preoperative FNAC in 228 patients and the results of FNAC were analyzed and compared with the corresponding histopathological diagnosis.⁹ Histological evaluation revealed 65 malignant tumors and 163 benign lesions. The cytological findings were non-diagnostic in 13 (5.7%). The accuracy, sensitivity, and specificity were 86%, 64%, and 95% respectively in their study.

In a retrospective study on 249 patients the sensitivity of FNAC for the diagnosis of malignancy was 80% with a specificity of 89.5%.¹² Among the 11 false-negative results, lymphomas and low-grade mucoepidermoid carcinomas were the most common histological types. Among the 16 false-positive results, Warthin's tumours, pleomorphic adenomas and lymphoepithelial lesions were the most common histological types. Accurate histological classification of the tumour was reported in 79.5% of cases (86% for benign tumours and 44% for malignant tumours). The authors concluded that FNAC is a reliable examination providing important information to the surgeon in the preoperative diagnostic assessment.

Cho et al in their study of 245 major salivary gland tumors had compared the histopathologic diagnoses with the preoperative cytology results.¹³ The overall sensitivity, specificity, and accuracy of sonographically guided FNAB in differentiating malignant from benign tumors was 75.7%, 100%, and 95.8%, respectively. The false negative diagnostic rate was 4.2% (9/215), but there were no false-positive diagnoses of malignancy. The conclusion of the study was that for the preoperative evaluation of major salivary gland tumors sonographically guided FNAB is feasible for distinguishing between benign and malignant salivary gland tumors in the subset of patients with satisfactory cytologic diagnoses.

Persson et al in their study of 216 patients reported a sensitivity of 87.5% and a specificity of 99.4% for FNAC.¹⁴ Qizilbash et al in their study of 155 patients reported a sensitivity of 90.7% and specificity of 98 % for FNAC.¹⁵

Brennan et al evaluated the utility of repeat fine-needle aspiration in cytological diagnosis of salivary gland lesions for unclear cases in order to improve the diagnosing accuracy.¹⁶ However the authors have reported the sensitivity and specificity in differentiating malignant from benign lesions similar to the initial examination (70% and 95% before, respectively 84% and 93% after repeated aspiration).

According to Lin et al, preoperative knowledge of the malignant nature of the tumour based on FNAC improves the success of initial surgical management and therefore has an impact on long-term survival.⁸ The preoperative information provided by FNAC in the case of a malignant result allows staging; definition of a surgical plan in terms of resection margins, the need for lymph node dissection, the degree of urgency of treatment and the risk of postoperative facial palsy.

That knowledge of cytological overlaps and pitfalls of salivary glands FNAC should always be considered. It has been seen that inflammatory masses of the salivary glands may mimic epithelial neoplasms at cytology because desquamated cells frequently populate the former. Details of the clinical information and radiologic features may help the pathologist to arrive at the appropriate diagnosis and reduce false interpretation.

CONCLUSION

Fine-needle aspiration is useful for clinical management of patients with parotid gland masses. Preoperative cytological assessment can differentiate in most cases benign versus malignant tumors, thus allowing surgeon to carry out appropriate treatment. A surgeon should correlate the inputs from FNAC and radiology and use his clinical judgement for proper surgical management.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- World Health Organization Classification of Tumours: Pathology and Genetics of Head and Neck Tumours. In: Barnes L, Eveson JW, Reichert P, Sidransky D, eds. France: IARC Press: Lyon; 2005: 212-215.
- Namboodiripad APC. A review: Immunological markers for malignant salivary gland tumors. J Oral Biol Craniofac Res. 2014;4:127–34.
- Ali NS, Akhtar S, Junaid M, Awan S, Aftab K. Diagnostic accuracy of fine needle aspiration cytology in parotid lesions. ISRN Surg. 2011;2011:721525.
- 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.
- Jain R, Gupta R, Kudesia M, Singh S. Fine needle aspiration cytology in diagnosis of salivary gland lesions: A study with histologic comparison. Cyto J. 2013;10:5.
- Curran AE, White DK, Damm DD, Murrah VA. Polymorphous low-grade adenocarcinoma versus pleomorphic adenoma of minor salivary glands: resolution of a diagnostic dilemma by immunohistochemical analysis with glial fibrillary acidic protein. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2001;91(2):194-9.
- Das DK, Petkar MA, Al-Mane NM, Sheikh ZA, Mallik MK, Anim JT. Role of fine needle aspiration cytology in the diagnosis of swellings in the salivary gland regions: a study of 712 cases. Med Princ Pract. 2004;13:95-106.
- Lin AC, Bhattacharyya N. The utility of fine-needle aspiration in parotid malignancy. Otolaryngol Head Neck Surg. 2007;136:793–8.
- Zbaren P, Schar C, Hotz MA, Loosli H. Value of Fine-Needle Aspiration Cytology of Parotid Gland Masses. Laryngoscope. 2001;111:1989–92.
- 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.
- 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.
- Fakhry N, Antonini F, Michel J, Penicaud M, Mancini J, Lagier A, et al. Fine-needle aspiration cytology in the management of parotid masses: Evaluation of 249 patients. Eur Ann Otorhinolaryngol Head Neck Dis. 2012;129(3):131–5.
- Cho HW, Kim J, Choi J, Choi HS, Kim ES, Kim SH, et al. Sonographically Guided Fine-Needle Aspiration Biopsy of Major Salivary Gland Masses: A Review of 245 Cases. Am J Roentgenol. 2011;196:1160–3.
- Persson PS, Zettergren L. Cytologic diagnosis of salivary gland tumors by aspiration biopsy. Acta Cytol. 1973;17:351-4.
- Qizilbash AH, Sianos J, Young JE, Archibald SD. Fine needle aspiration biopsy cytology of major salivary glands. Acta Cytol. 1985;29:503-12.
- Brennan PA, Davies B, Poller D, Mead Z, Bayne D, Puxeddu R, et al. Fine needle aspiration cytology (FNAC) of salivary gland tumours: Repeat aspiration provides further information in cases with an unclear initial cytological diagnosis. Br J Oral Maxillofac Surg. 2010;48:26-9.

Cite this article as: Dutta A, Bhat S, Dutta D, Sharma P, Gianchand S. Study and correlation of clinical, cytological and histopathological findings in diagnosis of parotid gland masses. Int J Otorhinolaryngol Head Neck Surg 2019;5:426-9.