ORIGINAL ARTICLE

Determine the Diagnostic Accuracy of Fine Needle Aspiration Cytology for Diagnosing Parotid Carcinoma

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ABSTRACT

Objective: To examine the diagnostic accuracy of FNAC for diagnosing malignant parotid lesions taking histopathology as a gold standard.

Study Design: Cross-sectional/Observational study

Place and Duration of Study: Shahida Islam Teaching Hospital Lodhran from 1st April 2017 to 30th June 2018.

Methodology: Eighty patients of both genders with ages 10 to 65 years clinically diagnosed to have parotid carcinoma were included. Patient's detailed demographics were recorded after taking informed written consent. Fine needle aspiration cytology was performed to all the patients and compares the findings with histopathological examination. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy of FNAC were examined.

Results: Fifty one (63.75%) were males while 29 (36.25%) were females with mean age 39.14±12.85 years. Eighteen (22.5%) patients had malignant and 62 (77.5%) had benign parotid lesion by FNAC and by histopathological examination 20 (25%) patients had malignant and 60 (75%) had benign lesions. Sensitivity, specificity, PPV, NPV and diagnostic accuracy of ultrasound compare to FNAC were 80%, 96.67%, 88.89%, 93.55% and 92.50% respectively..

Conclusion: Fine needle aspiration cytology plays an important role for diagnosing parotid carcinoma with high diagnostic accuracy rate. It is very helpful tool for making decision for the management of parotid carcinoma.

Keywords: Parotid carcinoma, Fine needle aspiration cytology, Histopathology

INTRODUCTION

Salivary gland tumours are uncommon, corresponding to approximately 3-10% of neoplasms of the head and neck regions.[1,2] However, a wide variety of benign and malignant tumours that can originate in these glands and insufficient tumour cells make their diagnosis difficult in some patients.[3] The fine-needle aspiration cytology (FNAC) of salivary glands provides essential information in making clinical decisions for their appropriate treatment.[4] It is a simple technique that is easy to perform, cheap and rarely has complications.[5] Efficiency of FNAC is questioned by some authors and defended by another.[6] Layfield et al[7] conducted a study on cost-effectiveness in regards to the FNAC of salivary glands and show that the fine-needle aspiration cytology can avoid the need for surgery by 35% of the masses diagnosed in the parotid gland. Fine-needle aspiration cytology surely distinguish between inflammatory lesions, which don't require a surgical procedure, and neoplastic lesions, differentiating between benign and malignant tumors, allowing the establishment of protocols of action on salivary gland tumors.[8,9] Low sensitivity and negative predictive value in screening tests can be attributed to the difficulty in diagnosis of low degree carcinomas, solely due to cell morphology.[10]

Although FNAC is globally accepted as a pre-surgical technique in head and neck tumors, its effectiveness in neoplastic lesions of salivary glands is controversial due to the low sensitivity reported by some authors, who question its efficacy. The present study was conducted aimed to examine the diagnostic accuracy of FNAC for diagnosing parotid carcinoma.

MATERIALS AND METHODS

This cross-sectional study was conducted at Shaidah Islam Teaching Hospital Lodhran from 1st April 2017 to 30th June 2018. A total of 80 patients of both genders with ages 10 to 65 years clinically diagnosed to have parotid tumor were included. Patient's detailed demographics including age, sex, body mass index (BMI) and family history of carcinoma were recorded after taking informed written consent. Patients on radioiodine therapy, already diagnosed, patients with surgical intervention and those with no consent were excluded from the study. Fine needle aspiration cytology was performed to all the patients and compares the findings with histopathological examination. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy of FNAC were examined. All the data was analyzed by SPSS 24.0. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy of ultrasound were examined.

RESULTS

There were 51 (63.75%) males while 29 (36.25%) females with mean age 39.14±12.85 years. Mean BMI was 26.17±4.25 kg/m^2. 6 (7.5%) patients had family history of carcinoma (Table 1). On FNAC examination, 18 (22.5%) patients had malignant and 62 (77.5%) had benign parotid lesion (Table 2). Twenty (25%) patients had malignant and

60 (75%) had benign lesions (Table 3). 16 (20%) patients were true positive, 2 (2.5%) were false positive, 4 (5%) were false negative and 58 (72.5%) were true negative. Sensitivity, specificity, PPV, NPV and diagnostic accuracy of FNAC compare to histopathology were 80%, 96.67%, 88.89%, 93.55% and 92.50% respectively. (Table 4)

Table 1: Baseline characteristics of all the patients

Variable	No.	%
Age (years)	39.14±12.85	
Gender		
Male	51	63.75
Female	29	36.25
Body mass index (kg/m^2)	26.17±4.25	
Family history		
Yes	6	7.5
No	74	92.5

Table 2: Findings of malignant thyroid nodules on FNAC

Finding	No.	%
Positive	18	22.5
Negative	62	77.5

Table 3: Findings of malignant lesion on histopathology

Finding	No.	%
Positive	20	25.0
Negative	60	75.0

Table 4: Comparison of ultrasound findings with FNAC

Ultrasound	FNAC		Total
	Positive	Negative	
Positive	TP 16	FP 2	18
Negative	FN 4	TN 58	62
Total	20	60	80

Sensitivity 80%, Specificity 96.67%, PPV 88.89%, NPV 93.55%

DISCUSSION

Parotid abnormalities are the common clinical disorders with high rate of morbidity and mortality.[11] Diagnostic modalities play an important role for the management of thyroid nodules. Many of studies illustrated that fine needle aspiration cytology is a useful tool for diagnosing malignancy of salivary glands but histopathological examination considered as a gold standard technique for diagnosing malignant cells.[12,13] Majority 63.75% patients were males while female population was 36.25% and the mean age of patients was 39.14±12.85 years. These results showed similarity to many of previous studies in which males were on high risk for developing parotid carcinoma and accounted 55% to 70% and the average age of patients with thyroid nodules was 42.5 years.[14,15]

In the present study, 18 (22.5%) patients had malignant and 62 (77.5%) had benign parotid lesion by FNAC while on histopathological examination 20 (25%) patients had malignant and 60 (75%) had benign lesions. A study conducted by Vaidya et al[16] regarding diagnostic accuracy of FNAC for diagnosing salivary glands malignancy, Amongst the neoplastic lesions, 76.9% were benign and 23.1% were malignant cases. Histopathological examination revealed that 81.05% of the cases were benign and 18.95% were malignant. Fine needle aspiration cytology had a sensitivity, specificity and diagnostic accuracy of 81.82%, 100% and 96.55%, respectively.

Dhanani et al[17] reported that fine needle aspiration cytology was performed preoperatively and the results were compared with the final histopathology, which showed sensitivity of 88.9%, specificity of 97.9%, positive predictive value of 93%, negative predictive value of 96.7% and diagnostic accuracy of 95.8%. Another study by Jechova et al[18] reported FNAC specificity was 82% and sensitivity was 71%. Positive and negative predictive values were 65% and 86% and positive likelihood ratio and negative likelihood ratio were 3.92 and 0.35, respectively.

CONCLUSION

Diagnostic tools like ultrasound, fine needle aspiration cytology and pathology examination are very essential for the management of parotid gland tumor. We concluded from this study that FNAC plays an important role for diagnosing malignant parotid carcinoma with high diagnostic accuracy rate. It is very helpful tool for making decision for the management of parotid carcinoma.

REFERENCES

1. Everson JW, Cawson RA. Salivary gland tumours. A review of 2410 cases with particular reference to histological types, site, age and sex distribution. J Pathol 1985;46:51-8.
2. Calearo C, Pastore A, Storchi OF, Polli G. Parotid gland carcinoma: analysis of prognostic factors. Ann Otol Rhinol Laryngol 1998;107:969-73.
3. Fulciniti F, Califano L, Zupi A, Vetrani A. Accuracy of fine needle aspiration biopsy in head and neck tumours. J Oral Maxillofac Surg. 1997;55:1094-7.
4. Bajaj Y, Singh S, Cozens N, Sharp J. Critical clinical appraisal of the role of ultrasound guided fine needle aspiration cytology in the management of parotid tumours. J Laryngol Otol 2005; 119: 289-92.
5. Mcguirt WF, Mccabe BF. Significance of node biopsy before definitive treatment of cervical metastatic carcinoma. Laryngoscope 1978; 88: 594-7.
6. Layfield LI, Gopez E, Hirschowitz S. Cost efficiency analysis for fine-needle aspiration in the workup of parotid and submandibular gland nodules. Diagn Cytopathol 2006; 34: 734-8.
7. Zurrida S, Alasio L, Tradati N, Bartoli C, Chiesa F, Pilotti S. Fine-needle aspiration of parotid masses. Cancer 1993; 72: 2306-11.
8. 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.
9. Stewart CJ, MacKenzie K, McGarry GW, Mowat A. Fine-needle aspiration cytology of salivary gland: a review of 341 cases. Diagn Cytopathol 2000; 22: 139-46.
10. Song TH, Song JS, Sung CO. Accuracy of core needle biopsy versus fine needle aspiration cytology for diagnosing salivary gland tumors. J Pathol Transl Med 2015; 49: 136-43.
11. Altin F, Alimoglu Y, Acikalin RM, Yasar H. Is fine needle aspiration biopsy reliable in the diagnosis of parotid tumors? Comparison of preoperative and postoperative results and the factors affecting accuracy. Braz.J Otorhinolaryngol 2019; 85(3): 275-81.
12. Comoglu S, Ozturk E, Celik M, Avci H, Sonmez S, Basaran B, et al. Comprehensive analysis of parotid mass: a retrospective study of 369 cases. Auris Nasus Larynx 2018;45:320-7.
13. Ghantous Y, Naddaf R, Barak M, Abd-Elraziq M, Abu Eln-Naaj. The role of fine needle aspiration in the diagnosis of parotid gland tumors: correlation with preoperative computerized tomography tumor size. J Craniofac Surg 2016;27:192-6.
14. Amita K, Rakshitha H B, Singh A, Shankar S V. Evaluation of accuracy of Milan system for reporting salivary gland cytology: Review of morphology and diagnostic challenges in each category. J Cytol 2020;37:18-25
15. Farahani SJ, Baloch Z. Retrospective assessment of the effectiveness of the Milan system for reporting salivary gland cytology: A systematic review and meta-analysis of published literature. Diagnostic Cytopathol 2019; 47(2): 67-87.
16. Vaidya S, Sinha A, Narayan S, Adhikari S, KC Sabira. A comparative study of fine-needle aspiration cytology and histopathology in salivary gland lesions. J Pathol Nepal 2011; 1: 108-13.
17. Rahim D, Haissan I, Muhammad A, Nida Z, Sehrish M. Role of fine needle aspiration cytology in the diagnosis of parotid gland tumors: analysis of 193 cases. Int Arch Otorhinolaryngol 2020;
18. Jechova A, Kuchar M, Novak Z, Koucky V, Dostalova L, Zabrodsky M, et al. The role of fine-needle aspiration biopsy (FNAB) in Warthin tumour diagnosis and management. *Eur Arch Otorhinolaryngol 2019;* 276(10): 2941-6.