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Research

Diagnostic Disparities of Fine Needle Aspiration Cytology in Major Salivary Gland Tumors

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Abstract

Objective

To analyse diagnostic disparities between (Fine needle aspiration cytology) FNAC and Post-op histology in major salivary gland malignancies and implicates role of FNAC in deciding surgical extent.

Methodology

Retrospective record analysis of major salivary gland tumours operated from august 2008 to July 2014 was done. Slides of patients with discrepancy between FNAC and post-operative biopsy were re-examined.

Results

128 surgeries (13 revisions) were performed. 5 out of 128 (3.90%) surgeries performed on benign FNAC proven lesions were malignant in post-operative histopathology. This led to under treatment in terms the surgical extend and radical intent of the surgeon.

Conclusion

Preoperative benign FNAC diagnosis of malignant major salivary gland lesions questions the reliability of FNAC. Mimicking cytological pictures leading to misdiagnoses seen in the present study and in literature; guide clinicians to decide surgical extent based on clinical, radiologic and intraoperative findings along with the FNAC rather than FNAC alone.

Keywords: Salivary Gland Malignancies; Fine Needle Aspiration Cytology; Fallacies; Histopatological Biopsy; Correlation

Introduction

Salivary gland tumours are uncommon, the world wide annual incidence of salivary gland tumours ranges from 0.4 to 13.5 cases per 100 000 population [1]. The annual incidence of salivary gland malignancy varies from 0.5 to 2 per 100,000 in various countries [2]. In Indian subcontinent the ratio of benign to malignant salivary lesion incidence is about 1.6:1 and parotid is the most common site for both benign and malignant lesions of the salivary glands [4]. The diagnostic yield of FNAC can be quite good with large study series showing sensitivity up to 85% and specificity up to 99% [5]. Though there is a high specificity many a times malignant tumours are reported as benign and vice a versa. This leads to under or over treatment of the patients which is specifically hazardous in cases of malignant lesions being treated as benign. In the case of a malignant FNAC result, the patient can be better prepared in terms of the extent of surgery, higher potential complications, and need for neck dissection or postoperative radiotherapy. The current study attempts to analyse diagnostic disparities encountered while dealing with major salivary gland malignancies and to implicate its role in deciding whether to resort only to the FNAC reports in major salivary gland lesions to determine the treatment plan to avoid under treatment in malignant lesions having benign FNAC diagnosis.

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Materials and Methods

Retrospective analysis of treatment, cytological analysis and histopathological records of major salivary gland tumours operated in the department of otolaryngology and head and neck surgery during August 2008 to July 2014 was done. Those having discrepancy between FNAC and post-operative biopsy were further reviewed; to evaluate the accuracy of the FNAC and postoperative histopathology diagnoses given earlier; by re-examination of the slides for deciding the further treatment plan including considerations for adjuvant therapy.

Results

Total of 128 surgeries including 13 revision surgeries for major salivary gland lesions were performed from August 2008 to July 2014. All revision surgeries were done for recurrent lesions. This included 113 parotid, 14 submandibular gland and one sublingual gland lesions in 72 males with 17 malignant, 54 benign and one metastatic lesion and 56 females with 13 malignant and 43 benign lesions.

Table1: Distribution of types of disease among the patients

Sex	Number	Nature of disease	Number
M	72	benign	54
		malignant	17
		metastatic	1
F	56	Benign	43
		malignant	13

5 out of 128 (3.90%) surgeries performed on FNAC proven benign lesions were found to be malignant in the post-operative biopsy. 4 FNAC diagnosed cases of pleomorphic adenoma were found to be mucoepidermoid Ca in 2 cases and adenoid cystic Ca and epithelial myoepithelial Ca in one case each in post-operative histopathology (Figure 1,2,3). One case of warthin's tumour was post-operatively diagnosed as mucoepidermoid Ca. 3.90% of the cases of major salivary gland tumours in our study were having a FNA and biopsy mismatch. Our study reports a sensitivity of 83.87% for detecting malignancies in major salivary gland tumours.

Table 2: Discrepancies between fine needle aspiration cytology and biopsy and respective pre and post-operative diagnosis .

Discrepancies in FNA and biopsy		
Total no of surgeries performed		128
Revision surgeries		13
Malignant tumors with preop benign FNA diagnosis		5
Pleomorphic adenoma		4
Post op HPE	Muco epidermoid Ca	2
	Adenoid cystic Ca	1
	Epithelial and myoepithelial Ca	1
warthin's tumour		1
Post op HPE	Muco epidermoid Ca	1

Discussion

Benign FNA diagnosis with a malignant histo-pathologic diagnosis led to under treatment in the primary setting in these patients. Evidences of similar occurrences are available in world literature. A FNA and Biopsy mismatch rate of 6.7% (4/60) was obtained by Huq., *et al.* [5] in their study. Nguansangiam., *et al.* [6] and Lü., *et al.* [7] presented a similar rate of 2.52% (3/119) and 1.76% (2/113) respectively.

We analyze the causes for mismatch between the fine needle aspiration cytology and final histopathological report. The possible causes were inadequate aspiration, too little aspiration due to deep seated malignancy in parotid gland, overlap of cytological features in between benign and malignant lesions, absence of hallmark cytological evidences of malignancy and presence of normal salivary gland tissue over the malignant tumor of salivary gland. Cytological yield can be improved with ultrasound and CT guided biopsy.

These discrepancies in the results of salivary gland surgery led to under treatment of malignant salivary gland tumours at primary surgery. Few patients had to be taken again to operating room for revision surgery to complete adequate surgical excision. Some had to be given adjuvant treatment. It is necessary to consider clinical signs in the patient and radiology in salivary gland malignancies to assist in predicting the lesion and the surgeon needs to consider intra operative findings in deciding the extent of surgery in the surgical specimen is suspicious of a malignant lesion on the surgical table to prevent under treatment as a result of FNA inadequacies. Frozen section biopsy at time of surgery can help in better decision making during surgery. But frozen section has its own imitations and is not completely reliable [8]. Frozen section was done in our patients to check for surgical margins and perineural spread.

Conclusions

Fine needle aspiration cytology is reliable diagnostic tool for salivary gland tumors. Surgical excision should not be based on solely the results of fine needle aspiration cytology. 5 out of 128 (3.90%) surgeries performed on FNAC proven benign lesions were found to be malignant in the post-operative biopsy in our study. This suggest role of other diagnostic test like frozen section and intraoperative findings and radiology should be considered while making decision regarding the extent of excision in salivary gland tumors.

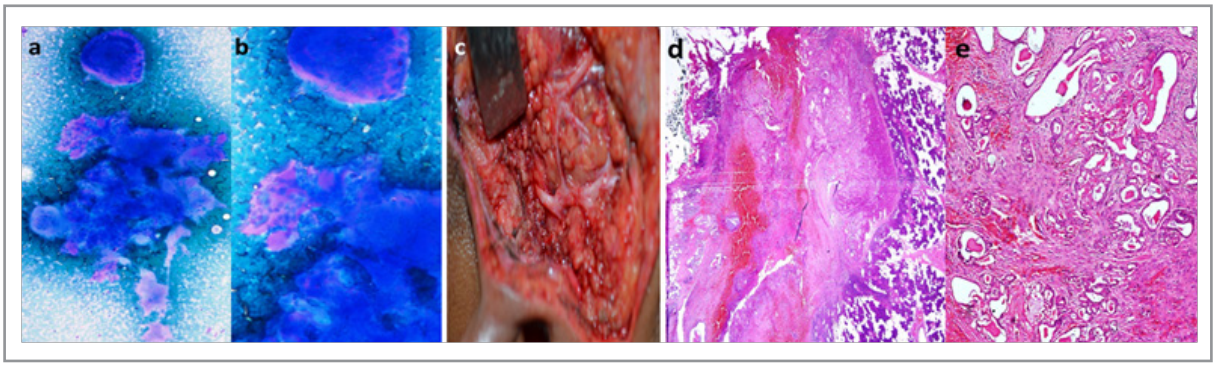

Figure 1
a and b: Chondromyxoid matrix and myoepithelial cells in clusters embedded in matrix in pleomorphic adenoma in FNA
c: Left superficial parotidectomy done in view of the benign FNA
d and e: Infiltrative border of the tumour, fibrous background, solid and cystic islands of tumour cells with presence of mucin, periphery looks normal parotid tissue. Many macro cysts and micro cysts a feature of Low grade Muco epidermoid Ca

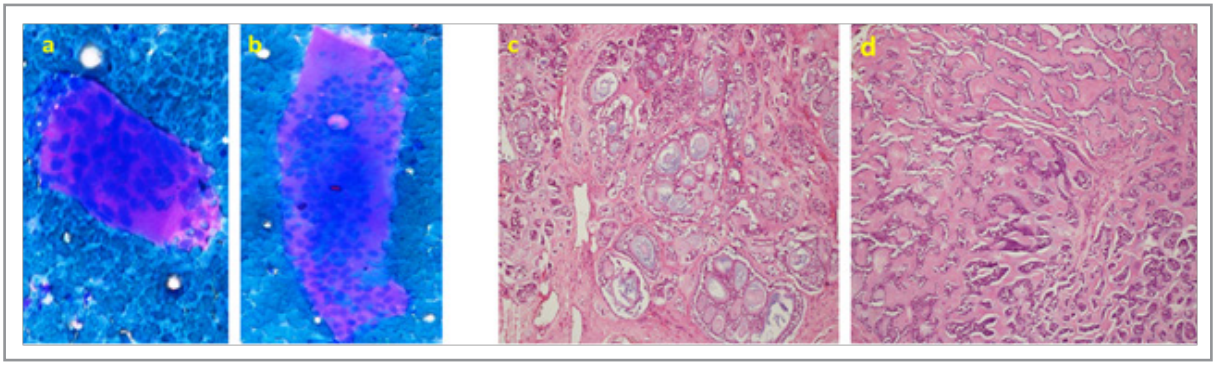

Figure 2
a and b: Small blue and large myoepithelial cells in clusters embedded in the matrix. FNA s/o pleomorphic adenoma
c and d: Invasive borders, tubules and cribriform structures, strangulation and withering of many cribriform tumour islands, with anastomosing trabeculae separated by abundant sclerotic or hyaline stroma. S/o Adenoid Cystic Ca.

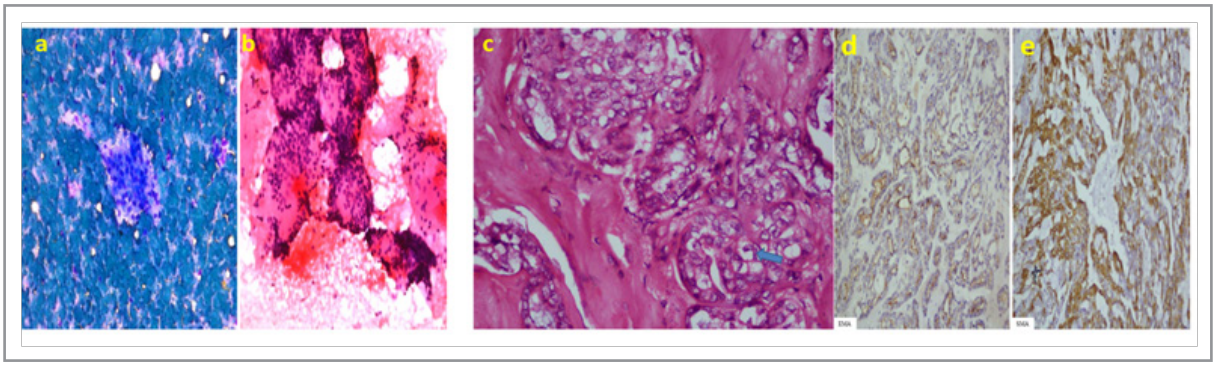

Figure 3
a: Fibrillar matrix with myoepithelial cells embedded in it. S/o pleomorphic Adenoma
b: Papanicolaou stain showing myoepithelial cells embedded in matrix. S/o Pleomorphic Adenoma
c: Bicellular architecture of neoplastic tubules comprised of a single layer of round to cuboidal luminal(ductal) cells, having bland nuclei and moderate amount of eosinophilic cytoplasm surrounded by one or more layers(mantle) of large polygonal abluminal (myoepithelial) cells, having abundant water clear cytoplasm (bold arrow) covered by a well-defined basement membrane. Suggesting epithelial-myoepithelial carcinoma.
d: Positivity of epithelial membrane antigen (EMA)
e: Positivity of smooth muscle antigen (SMA)

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