Fine Needle Aspiration Cytology of Epithelial Non-Odontogenic Orofacial Tumours

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ABSTRACT

Objective: FNAC is a method of obtaining material for cytopathologic evaluation. This study was aimed at determining the FNAC features of epithelial non-odontogenic orofacial tumours and the usefulness of FNAC for initial tumour assessment.

Methods: This was a prospective study performed on patients with suspicious orofacial non- odontogenic tumours in the Departments of Oral and maxillofacial Surgery and Oral Pathology & Medicine, University of Benin Teaching Hospital over a nine-month period. FNAC procedure was performed using 21-gauge needle (o.8mm diameter) and a 5ml or 10ml syringe. Aspirates were smeared on glass slides, fixed and stained with Hematoxylin and Eosin, Giemsa and Papanicolaou. Cytopathologic reviews of the smears were done and cytopathologic features documented. Surgical biopsy was also done for histopathologic confirmatory diagnosis. The tumours of epithelial origin were selected for the study.

Results: There were 14(35%) histopathologically diagnosed epithelial tumours consisting of squamous cell carcinoma (n=4, 28.6%), Mucoepidermoid carcinoma (n=6, 42.9%), Adenoid cystic carcinoma (n=1, 7.1%), Acini cell carcinoma (n=1, 7.1%), Epimyoepithelial carcinoma (n=1, 7.14%) and Pleomorphic salivary adenoma (n=1, 7.1%). The 14 cases had general cytopathologic diagnosis, either benign or malignant in nature. Those with specific definitive cytopathological diagnoses were squamous cell carcinoma (n=4, 100%) and mucoepidermoid carcinoma (n=2, 33.3%).

Conclusion: This study demonstrates the essential cytopathologic features following FNAC of epithelial non-odontogenic orofacial tumours useful in cytopathologic diagnosis. FNAC is recommended for use in the early pre-operative assessment of epithelial non-odontogenic tumours of the orofacial region.

Keywords: FNAC, orofacial, epithelial tumours, diagnosis.

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Received: 6-September-2020
Revised: 4-October-2020
Accepted: 16-October-2020

Citation: Okoh DS, Okoh M, Omoregie FO, Ojo MA. Fine needle aspiration cytology of epithelial non-odontogenic orofacial tumours. Nig J Dent Res 2021; 6(1):35-40.

INTRODUCTION

Cytopathology is the science of interpretation of cells that are either exfoliated from an epithelial surface or removed from various tissues. It is the study of disease at the cellular level and the use of cellular changes for the purpose of making diagnosis.[1] Fine Needle Aspiration Cytology (FNAC) is one of the ways of sampling specimen for cytopathological evaluation.[2,3] It is well-established and widely used to evaluate lesions including palpable lesions and with the aid of imaging studies, is equally applicable to deep seated lesions.[2] Cytopathology is capable of eliciting the cellular makeup of lesions and it is sufficient in identifying lesions that show malignant changes.[4,5] Studies have shown that FNAC is a minimally invasive procedure that has been proven to be safe, accurate, rapid, reliable, cost effective, patient friendly and an easy procedure.[3,6,7] Cytopathology has however not been extensively employed in the diagnosis of orofacial tumours in our environment. Common non - odontogenic epithelial tumours affecting the orofacial region encountered in dental and maxillofacial surgery include tumours of squamous epithelial origin like squamous cell carcinoma and tumours of salivary gland origin.[8,9] These tumours constitute a major health problem and late diagnosis can result in worsening morbidity and increased mortality.[9,10] Hence early evaluation of the cytopathologic features of the tumours following FNAC is useful in achieving initial pre-operative assessment of these tumours for early treatment. Therefore, this study is aimed at determining the FNAC features of non – odontogenic epithelial orofacial tumours and to re-emphasize the use of FNAC for early assessment of orofacial swellings.

MATERIALS AND METHODS

This was a prospective study performed on patients with clinically suspicious orofacial non- odontogenic tumours in the Departments of Oral and maxillofacial Surgery and Oral Pathology & Medicine, University of Benin Teaching Hospital for a period of nine months between March and November, 2013. Patients of all age groups with orofacial swellings that presented to the clinic within the study period that consented to having FNAC and biopsy were included in the study. Following history taking, clinical (both extraoral and intraoral) examination of the swellings were performed to determine the consistency of the swellings and if the swellings were soft tissue or bony lesions. Radiographic investigations were done to determine intrabony lesions and the extent of the lesions. The FNAC procedure was performed using 21-gauge needle (0.8mm diameter) and a 5ml or 10ml syringe. Aspirates obtained were smeared on glass slides. Half the number of the smeared slides were fixed in 95% ethyl alcohol immediately, while the other slides were air dried. The smears were processed and stained with Papanicolaou, Hematoxylin and Eosin (H and E) and Giemsa. Cytopathologic reviews of the smears were done using light microscopes jointly by two oral pathologist that are experienced in cytopathology. The cytopathologic features and diagnosis were made and documented prior to biopsy. Surgical open biopsy was done for each case within one to two weeks after FNAC procedure. For incisional biopsy the tissues were incised to obtain an elliptical or wedge shape representative specimen. Excision was done for the salivary gland lesions and post-surgical specimen sent for histopathology. The specimens were formalin fixed and paraffin embedded, processed and stained with hematoxylin and Eosin (H and E). The histopathology slides were reviewed under light microscopy and the histopathologic findings and diagnosis were documented. Cases diagnosed as non – odontogenic epithelial tumours were included in the study.

RESULTS

Forty cases of swellings which met the inclusion criteria were assessed within the study period. There were 25 females (62.5%) and 15 males (37.5%). The female to male was ratio of 1.7:1. The mean age of the patients was 36 $\pm$ 21.9 years. Fourteen of all the cases (35%) were diagnosed histopathologically as tumours of epithelial origin while 26 cases (65%) were non-epithelial. The non-epithelial tumours were excluded from this study. The non-odontogenic epithelial tumours consisted of squamous cell carcinoma (n=4, 28.6%), Mucoepidermoid carcinoma (n = 6, 42.9%), Adenoid cystic carcinoma (n =1, 7.1%), Acini cell carcinoma (n =1, 7.1%), Epimyoepithelial carcinoma (n =1, 7.14%) and Pleomorphic salivary adenoma (n =1, 7.1%). All the 14 FNAC cases had a general cytopathologic diagnosis, either benign or malignant in nature. Those with specific definitive cytopathological diagnoses were all the 4 cases of squamous cell carcinoma (Figure 1) and 2 cases of mucoepidermoid carcinoma (Figure 2) constituting 33.3% of the mucoepidermoid carcinomas.

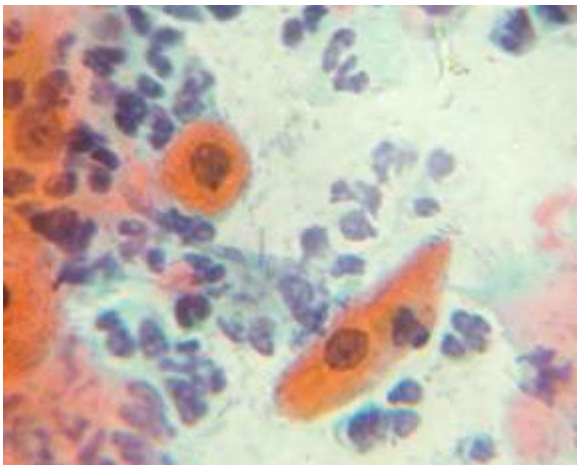

Figure 1: Cytopathologic photomicrograph of squamous cell carcinoma showing dyscohesive and clusters of Squamous epithelial cells with nuclear pleomorphism, vesicular nuclei and prominent nucleoli in loose background of inflammatory cells. (PAP x400)

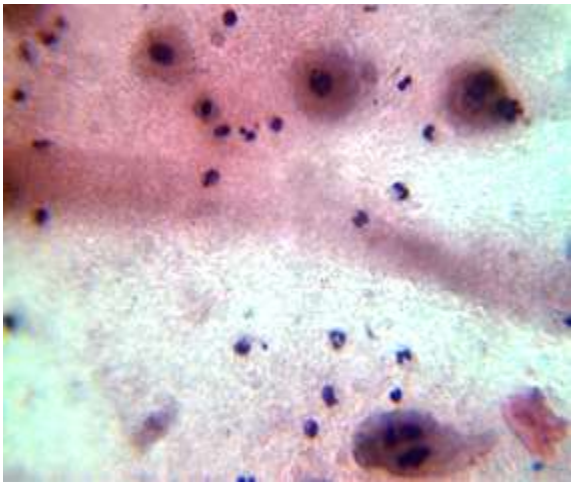

Figure 2: Cytopathologic photomicrograph of mucoepidermoid carcinoma showing pleomorphic epidermoid cells with hyperchromatic nuclei with vacuolated cytoplasm in a mucoid background. (PAP x400)

The 4 cytopathologically definitive squamous cell carcinomas in this study showed consistent findings characterized by dyscohesive and clusters of squamous epithelial cells with nuclear pleomorphism, vesicular hyperchromatic nuclei and prominent nucleoli in loose background of inflammatory cells. The 2 cytopathologically definitive diagnosed mucoepidermoid carcinoma showed pleomorphic epidermoid cells with hyperchromatic nuclei and some mucous cells with vacuolated cytoplasm in a mucoid background. Four of the mucoepidermoid carcinoma (66,7%), the adenocystic carcinoma, the acinic cell carcinoma and the epimyoepithelial carcinoma seen were diagnosed cytopathologically as salivary adenocarcinomas (fig. 3) with features characterized mostly by clusters of glandular epithelial cells with pleomorphic, hyperchromatic nuclei and pale cytoplasm. The pleomorphic salivary adenoma (fig 4) was diagnosed cytopathologically as a benign salivary gland tumour suggestive of pleomorphic salivary adenoma with smears that showed clusters of epithelial cells with uniform nuclei chromatin in a loose fibrillary background.

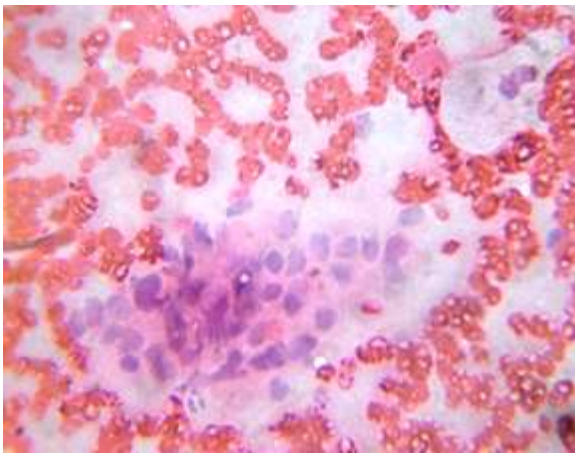

Figure 3: Cytopathologic photomicrograph of the salivary adenocarcinoma showing clusters of glandular epithelial cells with pleomorphic, hyperchromatic nuclei and pale cytoplasm. (H&E x400)

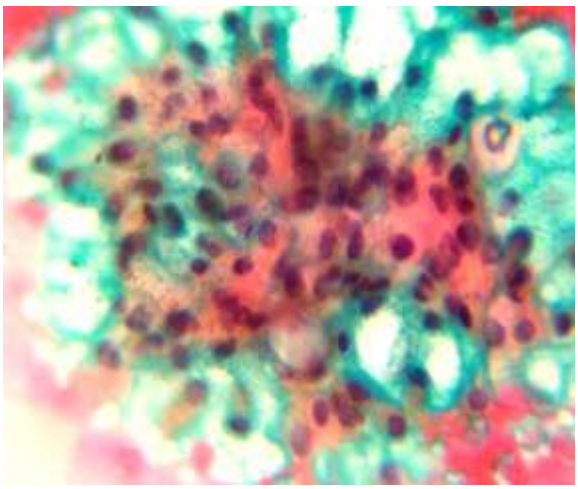

Figure 4: Cytopathologic photomicrograph of the Pleomorphic salivary adenoma showing clusters of

epithelial cells with uniform nuclei chromatin in a loose fibrillary background. (H&E x400)

DISCUSSION

FNAC is a widely used technique in the diagnosis of unclear lesions in the head and neck region.[11] It can be used both for screening and for early diagnosis. As a screening modality, it is capable of detecting the existence of a particular disease in a high-risk population, asymptomatic population or population with minimum symptoms of the disease. For early diagnosis, FNAC helps to determine the early clinical stages of disease in symptomatic subjects.[12,13] This study focused on the cytopathologic features of orofacial epithelial tumours, the most common neoplasm in the orofacial region as shown by previous reports.[8,9,14]

Cytopathological features of the epithelial tumours

-Squamous Cell Carcinoma

Several studies have stated that squamous cell carcinoma is the most commonly aspirated malignancy and FNAC was successful in the diagnosis of squamous cell carcinoma.[6,15,16] Cellular changes seen in dysplasia include abnormal variation in cell size and shape (anisocytosis and pleomorphism), increased nuclear/cytoplasmic ratio, enlarged and hyperchromatic nuclei, increased mitosis and abnormal mitotic figures, prominent and increased number of nucleoli.[17] Also, Saleh et al., (2008)[6] reported their findings in their FNAC smears as showing dyscohesive single and clusters of pleomorphic atypical dysplastic squamous cells with hyperchromatic nuclei. Similar findings were observed in the cytopathologic smears of our four cases of squamous cell carcinoma. Cytologic atypia in dysplastic epithelial cells are used in grading dysplasia. In mild dysplasia (grade I) cytological atypia is generally slight with only mild pleomorphism of cells or nuclei including hyperchromatism. Mitoses are not prominent, and when present, they are normal. Moderate dysplasia (grade II) demonstrates cytological changes which are more severe than in mild dysplasia and changes such as hyperchromatism, and prominent cellular and nuclear pleomorphism may be seen. Increased and abnormal mitoses may be present. In severe dysplasia (grade III) cytological atypia is very prominent. All the changes seen in mild and moderate dysplasia are seen but in addition there is marked pleomorphism often with abnormally large nuclei with prominent or even multiple nucleoli. Prominent mitoses are usually evident and abnormal tripolar or star-shaped forms may be seen. The cytopathology findings in the severe grade are very marked.[17] In this study however, we did not grade the squamous cell carcinoma using cytopathology. However, we graded them with their histopathology. Similar reports were made by Seetharam and Ramachandran (2008)[18] from their review of the cytopathology of 60 cases of squamous cell carcinoma. They indicated that FNAC can be used as a reliable diagnostic test for oral squamous cell carcinoma

-Salivary gland tumours

Salivary gland tumors are a heterogeneous group of neoplasms in the maxillofacial area with complex morphologic appearance and different clinical behavior consisting of the adenomas among which are pleomorphic adenoma (PSA) and the monomorphic adenomas; and adenocarcinomas among which are the mucoepidermoid carcinoma, adenoid cystic carcinoma and acinic cell carcinoma.[19,20] Our findings on the cytopathology features of the PSA in our study is similar to the findings by Saleh et al., (2008) [8] who reported FNAC smears of PSA showing cohesive cluster of bland uniform low-grade epithelial cells with admixed metachromatic myxoid fibrillary stroma and few spindle cells. The features of PSA differ from those of other benign salivary gland tumours – the monomorphic adenomas. Unlike PSA, FNAC of Warthin's tumour shows smears composed of focal collections of oncocytic epithelial cells surrounded by lymphocytes. The epithelial cells are typically bland, forming orderly sheets, and have finely granular cytoplasm. The background consists of an amorphous, granular or ropy substance that is frequently mucoid which are part of the cystic contents of the tumour.[21] In oncocytoma, FNAC smears show cohesive clusters of cells more often in papillary fragments with granular cytoplasm, representing mitochondria. The cells are large cuboidal to columnar pattern with prominent eosinophilic, finely granular cytoplasm and uniformly round, centrally placed nuclei.[22] Smears of basal cell adenoma shows proliferation of uniform, cytologically bland basaloid cells. There is myoepithelial differential in all of the morphologic patterns of basal cell adenoma.[23] In this present study, a cytopathologic definitive diagnosis of mucoepidermoid carcinoma was made in 2 cases (33.3%) of the 6 mucoepidermoid carcinomas. No specific cytopathological definitive diagnosis was

made in 4 (66.7%) of the mucoepidermoid carcinomas and each case of the adenoid cystic carcinoma, the acinic cell carcinoma and the epimyoepithelial carcinoma although their cytopathologic nature were determined. From their cytopathological features we were able to classify the tumours generally as salivary adenocarcinomas as it was difficult to make further specific definitive diagnosis beyond salivary adenocarcinomas. Klinjanienko and Vielh (1997)[24] carried out a study on smears of 50 cases of mucoepidermoid carcinoma. They reported cytopathologic diagnoses of mucoepidermoid carcinoma in 19 (38%) cases, 15 (30%) were classified as salivary gland carcinomas, 5 (10%) were suspicious of being salivary gland carcinomas, while six (12%) were benign tumours. The cytopathologic features of mucoepidermoid carcinoma reveals clusters of epithelial cells and mucoid substance. FNAC diagnosis of mucoepidermoid is based on the presence of mucous producing cells that are round, columnar or polyhedral with nuclei that are small and uniform lacking atypia and having cytoplasm that is finely vacoulated and also on the presence of intermediate epidermoid tumour cells that are arranged in clusters with small round uniform nuclei with homogenous cytoplasm.[24] In our study, our findings from the 2 cases that were specifically diagnosed as mucoepidermoid carcinoma showed similar cytopathologic description. This study therefore agrees with previous reports that cytopathology is useful for the diagnosis of salivary gland tumours.[24,25] In adenocystic carcinoma, the cytopathology of the tumor cells is relatively uniform displaying a basaloid appearance with angulated, hyperchromatic nuclei and scant, clear to eosinophilic cytoplasm. All grades are cytologically monomorphic and retain small dark angulated nuclear features.[26] Further studies of the malignant salivary gland tumours with a greater number of cases may reveal specific features of the separate salivary adenocarcinoma entities for possible definitive cytopathologic diagnosis of the tumours. Identifying rare entities and distinguishing salivary gland tumours that have overlapping cytopathological features is usually challenging with FNAC, hence histopathological examination can be helpful in confirming their diagnosis.[27] Furthermore, the use of immunocytochemistry technique using appropriate immuno-stains helps improve the cytopathologic diagnosis of the salivary gland tumours.[28]

CONCLUSION

This study demonstrates the cytopathologic features of FNAC of epithelial orofacial tumours. It describes the essential features that are useful in arriving at a cytopathologic diagnosis. Having a specific definitive diagnosis may be difficult in some cases especially with the salivary gland tumours, but in most cases the nature can be ascertained whether benign or malignant. Therefore, FNAC is recommended as an initial tool for the pre-operative assessment of epithelial tumours of the orofacial region before histopathologic evaluation. Oral pathologists should be conversant with the cytopathologic features of these tumours and employ FNAC as an early modality for prompt evaluation of orofacial tumours.

Source of Support
Nil.

Conflict of Interest
None declared

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