

Advantages and difficulties of brush cytology in the identification of early oral cancer

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SUMMARY

Background: Early oral cancer is asymptomatic and highly curable, but unfortunately most cancers are advanced by the time when they are discovered, so the mortality is relatively high. The aim of this study was to refer the advantages as well as the difficulties of brush cytology in the identification of early oral cancer.

Methods: Cytological smears obtained from of the oral mucosa of 36 patients were evaluated. The materials were taken with a cytobrush by scraping the surface of the suspected lesions, fixed with cytospray fixative and stained with the Papanicolaou method, whereas the residual was prepared by the liquid-based technique Thin-Prep 2000.

Results: There were 29 inflammatory and mild dysplastic lesions, three cases with mild dysplasia only and two cases with severe dysplasia possible carcinoma. Another two showed squamous cell carcinoma. Histological examination of possible malignant and malignant cases showed well differentiated squamous cell carcinomas, so wide excisions were performed.

Conclusion: Oral cytology is well accepted by the patient and attractive option for the early diagnosis of the oral cancer. It is useful when the lesion is large or multiple or the patients refuse biopsy. However there are factors that contribute to a false negative diagnosis such as the selection of the site of biopsy, necrosis, blood crusting, lack of adequate training, and the fact that malignant features of squamous cell carcinoma can be subtle resembling dysplasia.

KEY WORDS: Mouth Neoplasms; Biopsy; Mouth Mucosa; Carcinoma, Squamous Cell; Early Diagnosis

INTRODUCTION

Early oral cancers are asymptomatic, so unfortunately most of them are symptomatic and advanced at time of diagnosis (1). Early signs of oral cancer are painless, so it is difficult to detect them without a thorough head and neck examination by a medical or dental professional. Delayed diagnosis increases the mortality rate, with less than 50% of patients cured. Early detection of a premalignant oral lesion can improve the survival and the morbidity. It can also improve the patient's quality of life, because less aggressive treatment is necessary. The majority of oral cancers are squamous cell carcinomas. Cytological study of oral cells is a relatively inexpensive, simple, noninvasive, and risk-free technique that is well accepted by the patient. Oral cells can be obtained by a cytobrush that is easy to use in the oral cavity (2,3). In addition the liquid-based cytology can offer improved and repeatable preparations than conventional cytology, and reduce the false negative results (4,5). Moreover the residual material can be used for further investigation (6,7).

MATERIALS AND METHODS

Cytological smears obtained from various suspicious (ulcers, red or white lesions persisting more than two weeks, swelling, etc) lesions of the oral mucosa of 36 patients were evaluated. The materials were taken with a cytobrush by scraping the surface of the suspected lesions taking care to provide adequate and representative number of epithelial cells. The material was put onto a glass slide, fixed with cytospray fixative and stained with the Papanicolaou method., whereas the residual was placed into the Thin Prep vial (Cytyc Corporation) and prepared by the liquid-based technique Thin Prep 2000. Biopsies were performed under local anesthesia. Diagnoses were based on the WHO criteria.

RESULTS

There were 29 inflammatory and mild dysplastic lesions (mainly candidiasis) and three cases with mild dysplasia only. Two cases were diagnosed as severe

dysplasia possible carcinoma. Their smears were composed predominately of superficial dysplastic cells and ghost cells with heavily keratinized cytoplasm and karyolysis (Figure 1). Another two showed squamous cell carcinoma and their smears were composed of squamous cells pleomorphic in shape and size with pycnotic chromatin. There were also refractile keratin pearls (Figure 2).



Figure 1. Superficial dysplastic cells with heavily keratinized cytoplasm

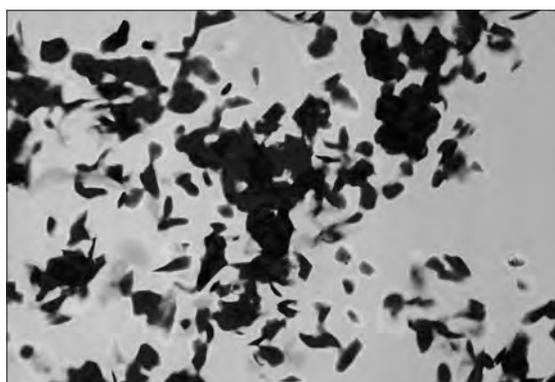


Figure 2. Refractile keratin pearls between anucleated squamous cells

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Tissue histological examination of possible malignant and malignant cases showed well differentiated squamous cell carcinomas, so wide excisions were performed. There were no signs of metastases and there was no evidence of tumor at the surgical margins.

CONCLUSION

Early cancers are asymptomatic, so that an early clinical diagnosis may be difficult. Cytologic method is well accepted by the patient and attractive option for the early diagnosis of the oral cancer. Patients with a history of oropharyngeal cancer may have repeated cytologic examinations for follow up or evaluation of radiation response of oral malignant cells. Oral cytology is useful when the lesion is large or multiple or the patients refuse biopsy. The brush has also the advantage of penetrating to the basement membrane collecting cells from all three epithelial layers of the oral mucosa. The liquid based cytology reduces the problems related to sampling and fixation and presents a better cytological morphology. Both sensitivity and specificity are better in liquid based cytology than in conventional cytology (8).

However there are factors that contribute to a false negative diagnosis:

1. *Selection of the site of biopsy.* Dysplasia and early curable oral cancers are lesions that may easily be overlooked and neglected (1,9,10). Dark blue staining using Toluidine blue offers the possibility of selecting the appropriate area for biopsy.
2. *Necrosis, blood crusting.* May cause difficulties involved in inadequate cytological sampling even in expert hands.
3. *Malignant features of squamous cell carcinoma can be subtle* resembling dysplasia. The great majority are well differentiated carcinomas showing slight nuclear abnormalities or anucleated hyperkeratinized cells (Figure 3).

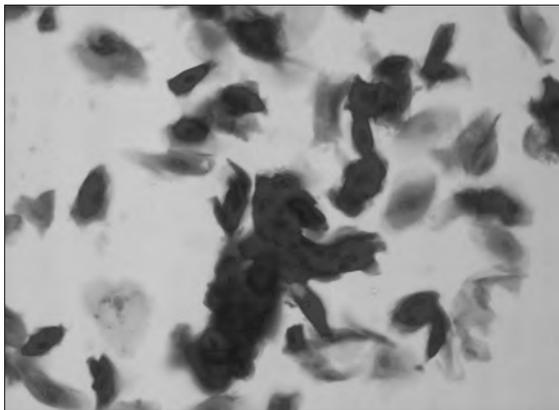


Figure 3. Anucleated hyperkeratinized cells from a case of well differentiated squamous cell carcinoma

1. *Lack of adequate training.* Dysplasia has to be differentiated from well differentiated squamous cell carcinoma and this may be difficult in some cases (7).
2. *Full thickness sampling is essential.* It is well known that atypical cells of the squamous epithelium are first recognized in the basal cell layer. This can be the only layer that contains abnormal cells, so the correct diagnosis finally may be lost. The oral brush technique overcomes this disadvantage because offers the ability cells from all layers to be harvested without local anesthetic.

Oral cytology is an accurate diagnostic adjunct that can be of significant value in early cancer detection, but not replace tissue biopsy. It is also useful as a screening procedure for a high risk population or for clinical follow up.

Conflict of interest

We declare no conflicts of interest.

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