REVIEW ARTICLE

Dysplasia in Oral Cavity: A Review

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ABSTRACT

Oral precancerous lesions are defined as altered epithelial lesions which may precede the formation of oral squamous cell carcinoma. Recently, these lesions are given a new term 'oral potentially malignant disorders'. It presents cytological and histopathological features with a simple grading as mild, moderate or severe dysplasia. Diagnosis of dysplasia is subjective, and considerable experience should be accrued before the significance of the variable features become fully apparent. This review describes the different classifications as well as the cytological and histopathological appearances of different grades of epithelial dysplasia.

KEYWORDS: Oral epithelial dysplasia, Precancerous lesions, Oral Potentially Malignant Disorders

INTRODUCTION

Dysplasia is a histopathological feature which suggests abnormal activity in normal epithelium. The term dysplasia was introduced by Reagon in 1958 in relation to cells exfoliated from the uterine cervix.[1] Earlier; Sharma N et al. (2010) stated dysplasia means abnormal, atypical proliferation encountered principally in the epithelium. Epithelial dysplasia, epithelial atypia and dyskeratosis were the terms used synonymously.[2] Also, Pereira JDS, et al. (2011) quoted oral epithelial dysplasias (OEDs) are potentially malignant disorders characterized by diverse degrees of cellular atypia.[3] Later, Goyal P et al. (2012) quoted oral epithelial dysplasia is the diagnostic term used to describe the histopathological changes seen in a chronic, progressive and a premalignant disorder of the oral mucosa.[4]

Recently, Rastogi V et al. (2013) described the term dysplasia refers to a series of subtle in cells signifies that anaplasia will develop soon. Dysplasia is theoretically reversible and therefore not malignant. When the underlying provoking stimulus is removed, the dysplastic alterations revert back to normal.[1] Also, Carmo MAV et al. (2013) described the term "dysplasia" is generally enrolled in the sense of a disordered development. In a stratified squamous epithelium, architectural disturbances affecting the normal maturity and stratification may occur.[5]

The most common precancerous lesions are leukoplakia and erythroplakia. Dysplastic epithelium is found in 5-4, 25% of biopsy samples of the leukoplakia. It should be emphasized that Leukoplakia is a clinical term, and its use carries no implications concerning the histological findings. It is recommended that a histopathological report should always mention the presence or absence of epithelial dysplasia and, if present, the degree of its severity.[4] Erythroplakia, seldom rare lesion than leukoplakia, almost constantly reveals epithelial dysplasia. Shafer and Waldron analyzed 65 cases of erythroplakia. All their cases showed some severity of epithelial dysplasia i.e., 51% - invasive SCC, 40% - carcinoma in situ or severe epithelial dysplasia, 9%- mild-to-moderate dysplasia. Clinically erythroplakia is a much more worrisome lesion than leukoplakia.[6]

GRADING SYSTEMS

Many dysplastic features in varying combinations are used for grading. Many researchers proposed different grading systems. Some of them are as follows:

1. **Shafer et al. (1983)**[6]

Based on the individual histopathological features and extension of the cytological changes in the epithelium from the basal cell layer and upward dysplasia has been subdivided into:

- *Mild (Grade I):* Demonstrates proliferation of atypical or immature basal cells above the parabasal region but not approaching beyond the lower third of the epithelium.
- *Moderate (Grade II dysplasia):* Identical features as in grade I into the middle one-third of the epithelium.
- *Severe grades (Grade III):* Demonstrates abnormal proliferation from the basal layer into the upper third of the epithelium.

2. **WHO Classification (1997)**[5] : The WHO's classification system is widely accepted among the pathologists. However, it is not able to revert the clinical behaviour of every single lesion and does not provide a clear therapeutic protocol to clinicians. Moreover, in spite of its wide acceptance, this system presents great variability and low reproducibility. According to it, lesions are categorised considering

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the architectural features, followed by cytological alterations it defined and listed out the 12 histologic characteristics that characterized the epithelial dysplasia:

- Irregular epithelial stratification.
- Loss of polarity of basal cells.
- Drop-shaped rete ridges.
- Increased number of mitotic figures.
- Abnormally superficial mitoses.
- Premature keratinisation in single cells (dyskeratosis).
- Keratin pearls within rete pegs.
- Nuclear pleomorphism: abnormal variation in nuclear shape.
- Cellular pleomorphism: abnormal variation in cell shape.
- Anisonucleosis: abnormal variation in nuclear size.
- Anisocytosis: abnormal variation in cell size.
- Increased nuclear size.
- Increased nuclear-cytoplasm ratio.
- Atypical mitotic figures.
- Increased number and size of nucleoli.

Accordingly, lesions should be classified into five groups, as described below:

1. *Hyperplasia*: describes a lesion showing an increase in cell number in the spinous layer and/or in the basal/parabasal cell layers. There are regular stratification and no cellular atypia.
2. *Mild dysplasia*: architectural disturbance only in the lower third of the epithelium with cytological atypia.
3. *Moderate dysplasia*: architectural changes approaching into the middle third of the epithelium is the main criteria, but the degree of cytological atypia may require advancing it to "severe".
4. *Severe dysplasia*: architectural changes affecting greater than two thirds of the epithelium, with cytological atypia.
5. *Carcinoma in situ*: indicates that malignant transformation has started but invasion has not. Full or almost full thickness architectural changes in cellular layers with pronounced cellular atypia. Atypical mitotic figures and abnormal superficial mitoses are common.

3. Ljubljana grading system (2003)[2]

Zerdoner D (2003) evaluated the applicability of the Ljubljana grading system, a classification suggested for grading of epithelial hyperplastic lesions of the larynx, to hyperplastic epithelial lesions originating in the oral cavity.

- *Simple hyperplasia*
- *Abnormal hyperplasia*
- *Atypical hyperplasia*
- *Carcinoma in situ*

4. Binary system (2005)[7] : Proposed by Omar Kujan et al., considered the lesions under:

- High risk lesions (with potential susceptibility for malignant transformation) is based on observing, at least, four architectural changes and five cytological changes. **(W.H.O criteria, 2005)**
- Low risk lesions (does not have the potential susceptibility for malignant transformation) is associated with noticing of less than four architectural changes or less than five cytological changes. **(W.H.O criteria)**

n/a	Mild Dysplasia
OIN 1	Moderate Dysplasia
OIN 2	Severe Dysplasia
OIN 3	Carcinoma in situ
OIN 4	No Dysplasia

DIAGNOSTIC METHODS FOR ORAL EPITHELIAL DYSPLASIA

Diagnostic aids helping in clinical diagnosis of dysplastic lesions are:

- Toludine blue staining - It is a metachromatic dye regarded as nuclear stain which makes possible visualizing dysplastic epithelial changes.[9]
- Brush biopsy - In this method smears are prepared, and PAP staining is performed to appreciate cytological changes like nuclear and cellular pleomorphism, enlarged nucleus etc.[8]
- Chemiluminescent illumination - Here, specific wavelength of light is absorbed by the normal cells and reflected back by abnormal cells which ultimately appear white.[10]
- Optical coherence tomography - In vivo, noninvasive optical coherence tomography allows high-resolution imaging of tissue surfaces and sub-surfaces, with the plausible efficacy for detection and mapping of epithelial pathologies. This technique is rapid, inexpensive well received by the patient and used in screening high risk population.[11]
- Auto fluorescence - Fluorescent light is used to diagnose endangered location in lesions. Fluorescent light with wavelength of 400 - 460nm in a dark room can localize danger zones as "blue", "green and black" or "black and black" appearances.[8]

MARKERS FOR DYSPLASIA

Currently, there is no strong affirmation for the use of tumor markers in the progression of oral dysplasia. There is a proposal from the long term studies that the presence of LOH/A1 at specific loci (3p and 9p), survivin, MMP9 positivity and DNA content (non diploid) are potential markers for increased opportunity of progression of oral dysplasia to cancer. Other markers identified are p53, p73, MMP1, MMP2 and cathepsin L mRNA, Bcl-2, but did not predict progression.[1,8]

CONCLUSION

Many grading systems uptill now have come to light. In future genetic and molecular based discoveries will

provide upgraded ways of detection and prediction of prognosis of various dysplastic lesions. However, histopathological examination of haematoxylin and eosin stained slides is still, the gold standard for assessing potentially malignant lesions.

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