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Original Research

Evaluation of apoptotic index in patients with oral epithelial dysplasia

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ABSTRACT:

Background: Oral squamous cell carcinomas (OSCC) are amongst the most aggressive of tumors. The present study was conducted to evaluate apoptotic index in patients with oral epithelial dysplasia. **Materials & Methods:** 58 cases of oral epithelial dysplasia were included. Slides were examined using microscope 40× magnification. 4 fields were selected and the number of epithelial cells was counted. The apoptotic bodies were counted and assessed by using the Leica application suite (LAS 2.0). **Results:** Grading of oral epithelial dysplasia was mild in 12, moderate in 20 and severe in 26 cases. The difference was significant (P< 0.05). AI in mild grade was 1.31, in moderate was 2.49 and in severe was 3.17. The difference was significant (P< 0.05). **Conclusion:** Apoptotic index can be used as a marker in assessment of oral epithelial dysplasia.

Key words: Apoptotic index, Oral squamous cell carcinomas, Oral epithelial dysplasia.

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INTRODUCTION

Oral squamous cell carcinomas (OSCC) are amongst the most aggressive of tumors. The 5-year survival rate reported for some parts of the oral cavity is as low as 9%, largely due to late-stage diagnosis of the tumor. [1] In the case of early detection and treatment of OSCC, the survival rate significantly increases from 66% to 85%.[2] It has been previously reported that the diagnosis and management at the "precancerous" stage would further improve survival rates.

OSCC is commonly preceded by a range of tissue and cellular alterations consistent with carcinoma, termed oral epithelial dysplasia (OED). These changes often manifest in a clinical mucosal lesion.[3]

Apoptosis is one of the main types of programmed cell death in multicellular organisms. Tremendous progress has been made regarding understanding; up regulation of apoptosis could help fight autoimmune disease and cancer, its inhibition could help control events ranging from aging to ischemic heart disease to brain disease.[4] Various means of detecting apoptotic cells have been explored and made available over the time. A technique of counting of apoptotic cells and apoptotic bodies has been discussed by various authors. It is an easy and cheap method that can be performed on hematoxylin and eosin (H and E) stained sections using light microscope.[5] The present study was conducted to evaluate apoptotic index in patients with oral epithelial dysplasia.

MATERIALS & METHODS

The present study comprised of 58 cases of oral epithelial dysplasia. A diagnosis was made with formalin-fixed, paraffin-embedded, and histopathology.

Slides were examined using microscope 40× magnification. 4 fields were selected and the number of epithelial cells was counted. The apoptotic bodies were counted and assessed by using the Leica application suite (LAS 2.0). AI was calculated as several apoptotic bodies/a total number of cells in one field which is expressed in percentage. Apoptotic bodies appear as a round oval mass of intensely eosinophilic cytoplasm with fragments of dense nuclear chromatin. Results thus obtained were subjected to statistical analysis using chi- Square test. P value less than 0.05 was considered significant.

RESULTS

Table I Grading of dysplasia

Grading	Number	P value
Mild	12	0.041
Moderate	20	
Severe	26	

Table I, Graph I shows that grading of oral epithelial dysplasia was mild in 12, moderate in 20 and severe in 26 cases. The difference was significant (P< 0.05).

Graph I Grading of dysplasia

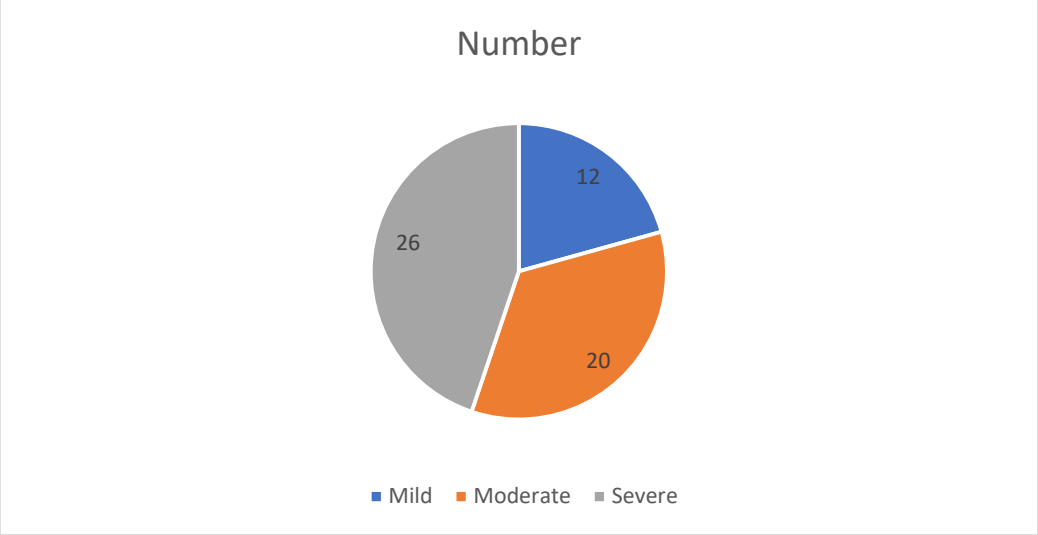
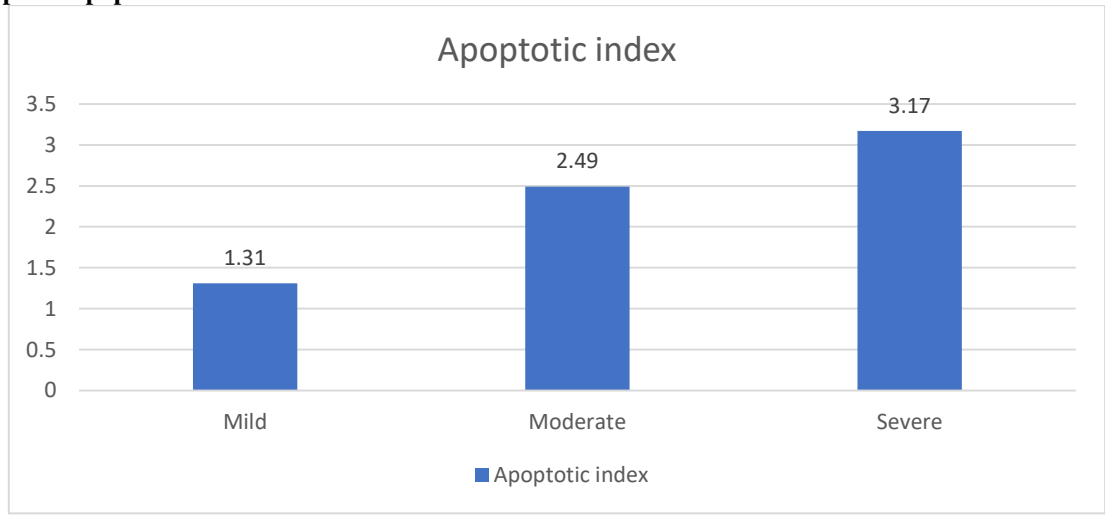


Table II Apoptotic index

Grading	Apoptotic index	P value
Mild	1.31	0.05
Moderate	2.49	
Severe	3.17	

Table II, graph II shows that AI in mild grade was 1.31, in moderate was 2.49 and in severe was 3.17. The difference was significant (P< 0.05).

Graph II Apoptotic index



DISCUSSION

Oral cancer is one of the most common cancers in third world and developing countries today. It is the fourth most frequent cancer after lung and stomach in males and fifth most common after cervix and breast in females. Assessment of cell death is performed by counting the apoptotic cells and apoptotic bodies using a light microscope. Since this is relatively an easy method and is feasible under routine circumstances, this technique has been used widely.[6]

OED is a commonly diagnosed oral lesions in India. In the Indian subcontinent, the incidence rates of OPMDs have ranged from 0.6 to 30.2 per 1000 population.[7] A regional variation in prevalence ranged from 0.2% in Bihar state in the north to 4.9% in Andhra Pradesh state in the east. OSCC is commonly preceded by a range of tissue and cellular alterations including OED. It has been suggested that alterations in apoptosis accompany the onset of invasion in OPMD.[8] Apoptosis is an ordered and orchestrated cellular process that occurs in physiological and pathological conditions. A large number of stimuli can induce apoptosis in a cell. Multiple signaling pathways lead to activation of the apoptosis depending on the triggering factor and the cell type. Apoptosis prevents the development of aneuploidy and other genetic aberrations that are associated with the development and progression of OPMD.[9] The present study was conducted to evaluate apoptotic index in patients with oral epithelial dysplasia.

In present study, grading of oral epithelial dysplasia was mild in 12, moderate in 20 and severe in 26 cases. Gupta et al[10] assessed the significance of apoptotic index (AI) as a prognostic marker in oral epithelial dysplasia (OED) and oral squamous cell carcinoma (OSCC). Study constituted of 60 previously histopathologically confirmed cases, 30 cases of OED and 30 cases of OSCC of different histopathological grades. A uniform section of 3-4 µm thickness was cut from all the blocks and was then stained using hematoxylin and eosin stains. AI was assessed using a binocular research light microscope. The mean AI increased progressively with increasing grades of OED and decreased with increasing grades of OSCC. A maximum mean AI was reported in well-differentiated squamous cell carcinoma (WDSCC). The results observed were significant ($P < 0.001$) on comparing WDSCC with moderately differentiated SCC (MDSCC) and with poorly differentiated SCC (PDSCC) but were insignificant on comparing MDSCC with PDSCC.

We found that AI in mild grade was 1.31, in moderate was 2.49 and in severe was 3.17. Various authors have suggested that increase in apoptosis occurs with disease progression, gradually up to carcinoma in situ but falls again in SCC. Increased apoptosis with increasing grades of neoplastic lesions is associated with large tumor size and with a shortened disease-free survival period. Compelling evidence indicates that oncogenic changes promote apoptosis during multistage carcinogenesis.[11] Kerr et al[12] had linked apoptosis to the elimination of potentially malignant cells, hyperplasia, and tumor progression. Hence, reduced apoptosis or its resistance plays a vital role in carcinogenesis. There are many ways by which a malignant cell can acquire a reduction in apoptosis or apoptosis resistance.

CONCLUSION

Authors found that apoptotic index can be used as a marker in assessment of oral epithelial dysplasia.

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