Research Article

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Oral Lichen Planus Relation with Respect to Analysis of Apoptotic Cell: A Research Approach

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ABSTRACT

Background: Apoptosis is a process of genetically programmed cell death by which senescent, DNA-damaged and diseased cells are eliminated from the body.

Aim: To identify and count the number of apoptotic cells in oral lichen planus (ORAL LICHEN PLANUS) and correlate with the degree of keratinization, thickness of epithelium and thickness of lymphocytic infiltration of ORAL LICHEN PLANUS.

Materials and Methods: The study comprised 80 diagnosed cases of ORAL LICHEN PLANUS. Sections were stained with hematoxylin and eosin to identify and count the number of apoptotic cells. Measurement of another histopathological parameter of ORAL LICHEN PLANUS such as degree of keratinization, thickness of epithelium and thickness of lymphocytic infiltration was done by using stage micrometer and eyepiece graticule. Statistical analysis was done to understand the correlation between apoptotic cells and histopathological features of ORAL LICHEN PLANUS.

Result: The result showed that the number of apoptotic cells increased, with an increase in thickness of lymphocytic infiltration and degree of keratinization, but there was a decrease in the epithelial thickness.

Conclusion: Further immunological and molecular studies are required for a stronger evidence in correlating apoptotic cell and histological parameters of ORAL LICHEN PLANUS.

Keywords: Oral lichen planus, keratinization, Apoptosis.

INTRODUCTION

An increase in the autoimmune disorders of mucocutaneous origin is noticed in recent years. Among the several diseases of this nature, lichen planus is one of the commonest. Oral lichen planus is a lymphocyte-mediated immunologic disorder in which the basal cells appear to be the targeted by T-lymphocyte. Lichen planus is histopathologically characterized by liquefaction degeneration of the basal layer associated with band-like inflammatory cell infiltration in the superficial lamina propria. The disease is lymphocyte-mediated; local release of cytokines is thought to interfere with lymphocyte function, as well as promote apoptotic death of basal keratinocyte.[1] Apoptosis is the process of elimination of cells that have completed their life cycle or on genetic damage have become useless or harmful for the organism.[2] Signaling for apoptosis occurs through multiple independent pathways that are initiated either from triggering event within the cell or from outside the cell by ligation of death

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receptor. All apoptosis-signaling pathways are activated by a family of cysteine protease (caspase) resulting in the formation of apoptotic bodies.[3] It is reported that the basal cell degeneration that is an important histopathological finding observed in lichen planus is mediated through the process of apoptosis.[4] Only few studies are available in the literature, regarding the relation between apoptosis and other histopathological feature of ORAL LICHEN PLANUS. So the present study is conducted to know the frequency of occurrence of apoptotic cells and their correlation with the different histopathological features of lichen planus.

MATERIALS AND METHODS

80 cases of clinically and histopathologically diagnosed ORAL LICHEN PLANUS were taken for the study. Sections of 5 mm were made from the archival wax blocks. Sections were stained with hematoxylin and eosin for histopathological identification of apoptotic bodies and assessment of other histopathological parameters such as amount of keratinization, thickness of epithelium, number of apoptotic bodies and lymphocytic infiltration .

Apoptotic cells were identified at the basal layer based on

following criteria put forward by Bloor *et al*.[5]

- Cell shrinkage
- Chromatin condensation at the periphery of the nucleus
- Uniform eosinophilic cytoplasm
- Nuclear and/or cytoplasmic fragmentation
- Nucleolar disintegration.

Total number of apoptotic cells were counted and recorded, simultaneously the same area was measured for other histopathological parameter. The obtained values were subjected to statistical analysis using Karl Pearson's correlation coefficient test.

RESULTS

In the present study, mean, range, standard deviation, of apoptotic cells in relation to epithelial thickness, lymphocytic infiltration and amount of keratinization in ORAL LICHEN PLANUS are as shown in Table 1.

The correlation between the number apoptotic cell and the epithelial thickness (P = 0.000) is highly significant. The correlation of the number of apoptotic cells with lymphocytic infiltration (P = 0.039) is statistically significant. The correlation of the number of apoptotic cells with amount of keratinization (P = 0.178) is statistically not significant.

Table 1: Mean, range and standard deviation of number of apoptotic cell, epithelial thickness, lymphocytic infiltration and amount of keratinization in OLP cases.

	Number of apoptotic cell per micrometer area	Epithelial thickness in micrometer	Thickness of lymphocytic infiltration in micrometer	Degree of keratinization in micrometer
Mean	0.8256	47.6096	138.06	16.543
Standard deviation	0.4806	19.286	84.654	8.5673
Range	1.76	82.20	368.06	38.763

DISCUSSION

ORAL LICHEN PLANUS is a chronic inflammatory condition that affects the oral mucous membrane with a variety of clinical presentation including reticular, papular, plaque-like, atrophic and ulcerative lesions. ORAL LICHEN PLANUS affects about 0.1-4% of the population, it is a disease of the middle-aged and is more common among women.[6] A large body of evidence supports a role for immune dysregulation in the pathogenesis of ORAL LICHEN PLANUS, specifically involving the cellular arm of the immune system. The inflammatory infiltrate consists primarily of T-cell and macrophages.[6] Local release of cytokines is thought to act on lymphocytes and infiltrating cluster of differentiation (CD)8 + lymphocyte secreting granzyme-B around keratinocyte, thereby

inducing keratinocyte nuclear injury and apoptosis.[6]

Some investigators have studied the number of apoptotic cells in hematoxylin and eosin-stained sections and compared it with the number of apoptotic nuclei identified by *in situ* end labeling (ISEL) in ORAL LICHEN PLANUS and normal buccal epithelium. Their result showed that higher number of apoptotic cells could be seen in hematoxylin and eosin stained sections than ISEL.[5] ORAL LICHEN PLANUS sections stained with the hematoxylin and eosin is favorable to appreciate the apoptotic cells. We could observe 0.8256 apoptotic cells/mm area of epithelium including basal and suprabasal layer of ORAL LICHEN PLANUS. Bloor *et al*., and few other investigators did studies and stated that the rate of apoptosis appears to be increased in ORAL LICHEN PLANUS epithelium compared with normal epithelium. Some author suggested that approximately one apoptotic cell was visualized per millimeter of basal length. When the third dimension is also taken into account, the rate of apoptosis per square millimeter of epithelium could in fact be high. Thus, number of apoptosis in single section may belie their significance in the disease process.[5] Our study showed that the number of apoptotic cell increased with an increase in thickness of lymphocytic infiltration and degree of keratinization, but the epithelial thickness was reduced. Dekker *et al*., stated that bcl-x was negative to weak in normal buccal mucosa and inflamed gingiva and moderate in ORAL LICHEN PLANUS. This overexpression of bcl-x found in keratinocytes may be related to the process of hyperkeratinization.[7] This could be probably explaining our observation of increase in the number of apoptotic cells with hyperkeratinization. Bloor *et al*., reported that the alteration in epithelial thickness was due to imbalance between cellular proliferation and apoptosis.[5] Neppelberg *et al*., stated that as the number of apoptotic cells at the basal degeneration area increased, a decrease in epithelial thickness was observed.[8] This observation is consistent with that of our study. Bloor *et al*., proved that both ISEL and histological count reveal significantly more apoptosis in the area of dense lymphocytic transgression of the epithelium/connective tissue junction. These findings are in accord with the generally held view of a causal role of lymphocyte and their cytokines in the induction of epithelial apoptosis.[5] In our study, we have also observed that the number of apoptotic cells was more in those areas where the lymphocytic infiltration was dense. Identification of apoptotic cells is a great task in the presence of dense lymphocytic infiltration and eosinophilic coagulum. The measurement of apoptotic cells and other histological parameters can only be two dimensional under light microscope. The assessment of epithelium thickness is difficult due to basal degeneration and also quantitative assessment of lymphocytic infiltration is difficult due to the variation in density from place to place. So further immunological and molecular studies are required to analyze and interpret the correlation of the number of apoptotic cells and other histopathological parameters of ORAL LICHEN PLANUS.

CONCLUSION

In the present study, measurement of epithelial thickness, lymphocytic infiltration and amount of keratinization were done. The present study results showed that the number of apoptotic cells increased, with an increase in thickness of lymphocytic infiltration and degree of keratinization but the thickness of the epithelium was reduced. Further advanced studies are required for a stronger evidence in correlating apoptotic cell count with other histological parameters of ORAL LICHEN PLANUS.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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