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**Original Article**

# A study on demographic profile and cell proliferative activity in Oral Lichen Planus (OLP) and Oral Epithelial Dysplasia (OED) using Ki-67 marker

G. Shailaja[1], J. Vijay Kumar[2], P. V. Baghirath[2], U. Kumar[3], G. Ashalata[2], A. Bhargavi Krishna[2]

[1]Department of Oral and Maxillofacial Pathology, SVS Dental College, Mahaboobnagar.
[2]Departments of Oral and Maxillofacial Pathology and [3]General Pathology, Panineeya Dental College, Chaitanyapuri, Dilsukhnagar, Hyderabad, Telangana, India

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## ABSTRACT

**Background:** In oral lichen planus (OLP), destruction of the basal cell layer, which is one of the characteristic histological features, is seen and many changes in cell proliferation, cell repair and cell death occur in the injured mucosal epithelium. Lichen planus is a mucocutaneous disease, and its potential for malignant transformation is a subject of controversy. **Objective:** This study aimed to study on demographic profile and evaluate Ki-67 expression in OLP and OED. **Materials and Methods:** A cross-sectional study was carried out in 60 samples, categorized Group 1 (30 OLP) and Group 2 (30 OED) samples. Four µm thick sections were obtained and stained with monoclonal antibodies such as Ki-67 and analysed for number of positive cells and also for intensity of staining. Statistical analysis was done by using Mann Whitney–U test ($P \leq 0.05$). **Results:** Significant results were found only for expressions of Ki-67 in both study groups ($p<0.05$).

**Keywords:** Lichen Planus, Oral Epithelial Dysplasia, Ki-67 marker, Immunohistochemistry

## INTRODUCTION

The lesions or conditions of oral cavity with potential malignancy were defined as "potentially malignant disorders" (OPMDs) in a workshop coordinated by World Health Organization (1). It is well accepted that OPMDs could precede oral squamous cell carcinoma (OSCC) (2). In a wide range of different OPMDs, lichen planus (OLP) is an autoimmune chronic disease mediated by T lymphocytes that involves the stratified squamous epithelial tissue which etiology and pathogenesis is not completely understood (3).

The etiopathogenesis in Oral lichen planus (OLP) appears to be complex, with interactions between and among genetic, immune, environmental, and lifestyle factors (4). OLP affects 1-2% of the general adult population affecting women more than men (1.4:1) and occurs predominantly in adults over 40 years of age, although occurrence of this disease in younger adults and children is not unusual (5-6). Ki-67 is a cell cycle associated human nuclear protein present in peri-chromosomal region, the expression of which strictly associated with cell proliferation and which is widely used in pathology as a proliferation marker to measure the growth fraction of cells in human tumors. The estimated half-life of Ki-67 antigen is 60-90 minutes. The Ki-67 antigen starts to be expressed in the S phase, progressively increasing through S and G2 phases and reaching a plateau at mitosis. After cell division, the cells return to G1 with a stock of Ki-67 antigen, whose level decreases rapidly during this phase (7).

**Objective:** This study aimed to study on demographic profile and evaluate Ki-67 expression in OLP and OED.

## MATERIALS AND METHODS

A cross-sectional study was carried out in 60 samples, categorized Group 1 (30 OLP) and Group 2 (30 OED) samples in the Department of Oral Pathology and Microbiology, Panineeya Mahavidyalaya Institute of Dental Sciences, Hyderabad. Study group comprised a total of 60 formalin fixed archival blocks after

***Corresponding Author Address:** Dr. G. Shailaja, H No. 5-51-1-1, Chaitanyapuri, Beside Raghunatha Model High School, Dilsukhnagar, Hyderabad - 500 060, Telangana State, India.*

histopathological confirmation which were divided into two groups (30 each of OLP and OED). The site selected was buccal mucosa in all the samples. The study was approved by the Institutional Ethical Committee.

Cases of clinically and histopathologically diagnosed OLP and OED, without any previous history of treatment for any type of oral diseases and subjects who were not on any sort of medication were included in the study. Pregnant women with OLP and OED, subjects with OLP along with OED, immune compromised patients and patients with multiple oral and/head and neck lesions were excluded.

Four µm thick sections were obtained and stained with monoclonal antibodies such as Ki-67 and analysed for number of positive cells and also for intensity of staining.

Statistical analysis was done by using Mann Whitney–U test (P≤0.05).

Ki-7 expression were classified according to the number of positively stained cells per 1000 counted cells. The percentage of positive cells was scored according to the method of Nakagawa *et al* (8).

## RESULTS

The present study evaluated 30 patients with OLP and 30 patients with OED. Both males and females were found to be equally distributed in all the groups. The mean age of the cases in group 1 and 2 was 40.03 and 40.76 years respectively.

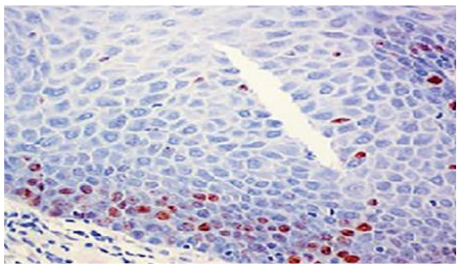

Figure 1: Immonohistochemical view (×20) Ki-67. Showing nuclear brown staining of tumor markers in basal and parabasal cells of oral lichen planus

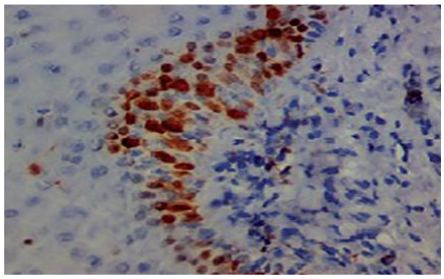

Figure 2: Immonohistochemical view (×20) Ki-67. Showing nuclear brown staining of tumor markers in basal and parabasal cells of oral epithelial dysplasia

Table 1: Age distribution of patients

| Age group in years | Group 1 | Group 2 |
|---|---|---|
| <30 | 2 | 0 |
| 30-40 | 15 | 14 |
| 40-50 | 11 | 14 |
| >50 | 2 | 2 |
| Total | 30 | 30 |

Table 2: Gender distribution of patients

| Group | Male | Female | Total |
|---|---|---|---|
| 1 | 14 | 16 | 30 |
| 2 | 16 | 14 | 30 |

Table 3: Age and gender distribution of patients

| Age group in years | Group 1 | | Group 2 | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| <30 | 2 | 0 | 0 | 0 |
| 30-40 | 6 | 9 | 8 | 6 |
| 40-50 | 6 | 5 | 5 | 9 |
| >50 | 2 | 0 | 1 | 1 |
| Total | 16 | 14 | 14 | 16 |

Chi-Square for group 1, age and gender = .201 (NS)

Chi-Square for group 2, age and gender = .522 (NS)

Table 4: Positive Ki-67 based on group distribution

| | Yes | No |
|---|---|---|
| Group 1 | 22 | 8 |
| Group 2 | 26 | 4 |
| Total | 30 | 30 |

Table 5: Positive Ki-67 based on age group and group

| Age group in years | Group 1 | | Group 2 | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| <30 | 2 | 0 | 0 | 0 |
| 30-40 | 12 | 3 | 11 | 3 |
| 40-50 | 7 | 4 | 13 | 1 |
| >50 | 1 | 1 | 2 | 0 |
| Total | 22 | 8 | 26 | 4 |

Chi-Square for group 1, age and Positive Ki-67 = .541 (NS)
Chi-Square for group 2, age and Positive Ki-67 = .457 (NS)

Table 6: Positive Ki-67 based on gender and group

| Age group in years | Group 1 | | Group 2 | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| Male | 10 | 4 | 13 | 3 |
| Female | 12 | 4 | 13 | 1 |
| Total | 22 | 8 | 26 | 4 |

Chi-Square for group 1, gender and Positive Ki-67 = .871 (NS)
Chi-Square for group 2, gender and Positive Ki-67 = .049 (Sig)

## DISCUSSION

Our present study focussed on This study aimed to study on demographic profile and evaluate Ki-67 expression in OLP and OED by comparing the frequency of positively stained proteins of Ki-67. Total of 60 cases were included for the study.
Majority of the study subjects were in 30-40 year age group in group 1 (50%) and group 2 (46.7%). Majority of the study subjects were female in group 1 (53.3%) and male in group 2 (53.3%).

Chi-Square for group 1, age and gender = .201 which is non-significant. Chi-Square for group 2, age and gender = .522 which is non-significant.
Positive Ki-67 based on group distribution is seen in 73.3% in group 1 and 86.7% in group 2 cases. Chi-Square for group 1, age and Positive Ki-67 = .541 which is non-significant. Chi-Square for group 2, age and Positive Ki-67 = .457 which is non-significant.
Chi-Square for group 1, gender and Positive Ki-67 = .871 which is non-significant. Chi-Square for group 2, gender and Positive Ki-67 = .049 which is significant.

There is a significant association between gender and Positive Ki-67 in group 2 cases when compared to group 1 cases.

Our results were similar to Sugerman *et al* (8) in group 1 where female cases are more and Brothwell *et al* (8) where male cases are more.
In Group 1, the Ki-67 positivity was found to be 73.3% which is lower than Fakhrjou and Toutounchi (86.7%) (9) and Acay *et al* (95.4%)(10). The authors explained that this high positivity of Ki-67 could be due to an increased cell proliferation, secondary to repeated break down of cycling cells leading to increased state of proliferation (11).

The Ki-67 positivity in Group 2 was found to be 86.7% in the present study with almost similar value observed in a study by Raju *et al* (12) (93%). The increase in the proliferative activity could be due to alteration in P53 activity. The percentage positivity for Ki-67 in Group 1 is lower than that of Group 2 and this difference is in the expected direction in that dysplastic lesions have a higher growth fraction.

## CONCLUSION

Group 1 and Group 2 established a potential tendency for malignancy and Ki-67 can be considered as reliable prognostic markers for malignancy.

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