Original Article

Clinicopathological Profile and Malignant Transformation in Oral Lichen Planus: A Retrospective Study

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Abstract

Objectives: The aim of this study was to analyze the histopathologically diagnosed cases of oral lichen planus (OLP) in terms of age, gender, clinical variant, site, hyperpigmentation, systemic illness, grade of dysplasia, and associated malignant transformation. This study also intended to do a review of reported cases of OLP with malignant transformation.

Materials and Methods: One hundred and forty-three cases of histopathologically diagnosed OLP between 2010 and 2016 were retrospectively reviewed. Demographic and clinicopathological data including malignant transformation were obtained. The data obtained were analyzed using the Statistical Package for the Social Sciences (SPSS) software for Windows version 20.0 (IBM SPSS, SPSS Inc., Chicago, IL, USA). A review of published literature on OLP with malignant transformation was also done from 1988 to 2017 and tabulated.

Results: OLP in this study showed a male predilection with most of the patients in the third decade. The buccal mucosa (bilateral presentation) was the most common site (79.72%), and reticular type was the most common clinical type (79.02%) followed by erosive type (20.98%). The majority (92.31%) of cases were diagnosed with OLP without dysplasia. The rest (7.69%) of dysplastic cases were predominantly seen in the buccal mucosa of 58 years and above, female patients manifesting mainly as erosive type. Two patients (1.4%) previously diagnosed clinically and histopathologically as OLP developed oral squamous cell carcinoma.

Conclusion: The present investigation revealed the predominance of OLP among middle-aged male population and the prevalence of bilateral involvement of buccal mucosa. Two of our cases showed malignant transformation over an average period of 3.5 years. The outcome of this study emphasizes the role of clinical follow-up of patients with OLP.

Keywords: *Malignant transformation, oral lichen planus, prevalence*

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Introduction

Oral lichen planus (OLP) is one of the common immune-mediated mucocutaneous disease characterized by chronic inflammatory process. The World Health Organization (WHO) has described OLP as a "potentially malignant disorder." Patients with OLP should be closely monitored; however, the risk of progression to carcinoma is comparatively lower than other potentially malignant disorders.[1,2] The disease is usually seen in about 1%–2% of the population, mostly affecting females in the third to sixth decade of life.[3] Various sites in the oral cavity are affected with buccal mucosa being the most common site followed by tongue and gingiva. Clinical variants include reticular, erosive, atrophic, bullous, papular, and plaque-like, with reticular variant being the most common. Histopathologically,

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OLP is characterized by subepithelial band of lymphohistiocytic infiltrate and basal keratinocyte degeneration.[4]

OLP is considered as a T-cell-mediated autoimmune disease wherein the cytotoxic $CD8^+$ T-cells trigger apoptosis of the basal keratinocytes.[5] Several antigen-specific and nonspecific inflammatory mechanisms have been put forward to explain the pathogenesis of disease; however, the exact mechanism remains unknown.

Several studies have been done in the past, determining the rate of malignant transformation of OLP, since Hallopeau first described a case of carcinoma arising in lichen planus of oral mucosa in the year 1910.[6] The reported transformation rate documented in the past literature varies from 0% to 9% with erosive form being the most commonly associated clinical variant.[7,8] The period required for malignant transformation varies too. According to a study by Fang et al. on 2119 OLP patients, 1.1% of them developed into squamous cell carcinoma.[9]

The present retrospective study was done to analyze the histopathologically diagnosed cases of OLP in terms of age, gender, clinical variant, site, hyperpigmentation, systemic illness, grade of dysplasia, and associated malignant transformation. The cases diagnosed as OLP from 2010 to 2016 were obtained from the archives of Department of Oral Pathology and Microbiology, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha, and were analyzed. This study also intended to do a review of reported cases of OLP with malignant transformation.

Materials and Methods

The study consisted of retrospectively reviewed cases of histopathologically diagnosed OLP according to the modified WHO criteria[10] [Table 1] from the archived records of the patients in the Department of Oral Pathology and Microbiology, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha. Figures 1 and 2 show classical histopathological features required to diagnose OLP as per the modified WHO criteria.

A total of 143 records were identified between 2010 and 2016, which were confirmed cases of OLP and hence constituted the study sample. The study was approved by the Institutional Ethics Committee (Letter no. KIMS/KIIT/IEC/51/2016). Demographic and clinicopathological data such as gender, age, habits of tobacco and alcohol use, clinical presentation, site of involvement, medical history, clinical types, and presence or absence of dysplasia in histopathology were obtained. Patients with coexisting tobacco-associated potentially malignant disorders were excluded from the study.

The data obtained were analyzed using the Statistical Package for the Social Sciences (SPSS) software for Windows version 20.0 (IBM SPSS, SPSS Inc., Chicago, IL, USA). Chi-square test was done to establish association between clinicopathological characteristics and occurrence of OLP. The association between malignant transformation of OLP and clinicopathological parameters was descriptively analyzed. P <0.05 was considered statistically significant.

Results

A total of 143 histopathologically diagnosed cases of OLP were retrospectively analyzed, of which

Table 1: World Health Organization diagnostic criteria (1978) for oral lichen planus

Histopathologic criteria
The presence of a well-defined band-like zone of cellular infiltration that is confined to the superficial part of the connective tissue, consisting mainly of lymphocytes
Signs of "liquefaction degeneration" in the basal cell layer

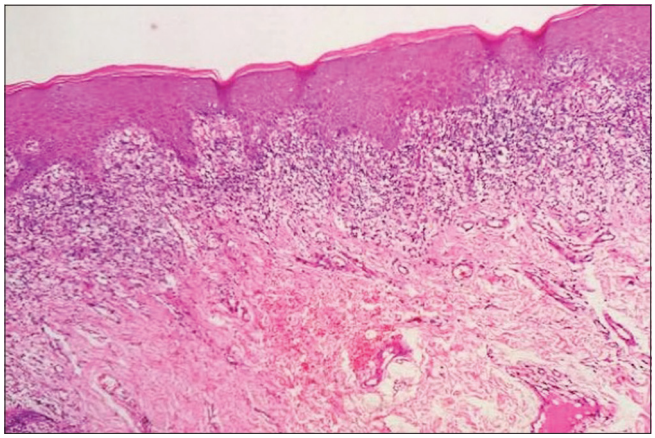

Figure 1: Photomicrograph showing stratified squamous epithelium with saw-tooth rete pegs and intense lymphocytic infiltrate subepithelially in a band-like pattern (H and E, ×10)

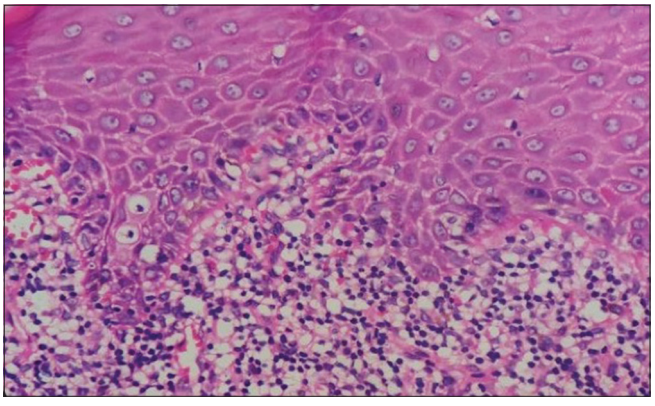

Figure 2: Photomicrograph showing basal cell degeneration and subepithelial lymphocytic infiltration (H and E, ×40)

78 (54.55%) were male and 65 (45.45%) were female. Most of the patients were in the third decade of life. The buccal mucosa (bilateral presentation) was the most common site of occurrence (79.72%). Only two clinical types were encountered in the entire study population, of which the reticular type was the most common form and was present in 113 (79.02%) patients. The remaining 20.98% cases showed erosive type of OLP. About 68.53% of patients did not show any associated systemic diseases. Of the remaining 31.47% who reported incidence of systemic diseases, Type 2 diabetes mellitus (DM) was the most common (13.29%) followed by concomitant presence of both Type 2 DM and hypertension (8.39%). Table 2 shows the distribution of patients by different epidemiological and clinical characteristics.

Table 2: Distribution of patients by different epidemiological and clinical characteristics

Factors	Number of patients (%)
Age groups (years)	
18-27	32 (22.38)
28-37	44 (30.77)
38-47	33 (23.08)
48-57	17 (11.89)
58+	17 (11.89)
Gender	
Male	78 (54.55)
Female	65 (45.45)
Site	
Buccal mucosa (bilateral)	114 (79.72)
Buccal mucosa tongue	3 (2.10)
Left alveolar mucosa	4 (2.80)
Left buccal mucosa	4 (2.80)
Lower labial mucosa	4 (2.80)
Right buccal mucosa	9 (6.29)
Tongue	5 (3.50)
Clinical types	
Erosive	30 (20.98)
Reticular	113 (79.02)
Site of biopsy	
Left alveolar mucosa	2 (1.40)
Left buccal mucosa	53 (37.06)
Lower labial mucosa	4 (2.80)
Right buccal mucosa	78 (54.55)
Tongue	6 (4.20)
Systemic diseases	
No	98 (68.53)
DM	19 (13.29)
DM hypertension	12 (8.39)
Hypertension	7 (4.90)
Hypothyroidism	2 (1.40)
Rheumatoid arthritis	5 (3.50)
Total	143 (100.00)

DM=Diabetes mellitus

Male and female patients were compared and significant differences were observed in terms of age ($P = 0.0140$), site ($P = 0.0060$) of occurrence, associated systemic diseases ($P = 0.0030$), and presence or absence of pigmentation ($P = 0160$). Buccal mucosa was the most common site in both males and females. Type 2 DM was the most commonly associated systemic disease in females whereas coexistence of Type 2 DM and hypertension was most common among males. Almost 58.49% of females had intraoral pigmentation mainly in the buccal mucosa in contrast to 41.51% in males. Table 3 shows comparison of male and female patients in terms of different demographic, clinical, and pathological characteristics.

When the association between the prevalence of OLP (with and without dysplasia) and different demographic and clinical parameters was considered, a significant difference was observed in terms of age groups ($P < 0.001$), site of the lesion ($P < 0.0280$), and clinical types ($P < 0.0001$). The majority (92.31%) of cases in this study were diagnosed with OLP without dysplasia. The rest (7.69%) of cases, which showed dysplasia, were predominantly seen in females in the age group of 58 years and above, commonly occurring in the buccal mucosa and manifesting mainly as erosive type. Table 4 shows the association between the prevalence of OLP (with and without dysplasia) and different demographic and clinical parameters.

Of 143 patients, two (1.4%) previously diagnosed clinically and histopathologically as OLP developed oral squamous cell carcinoma (OSCC) when the association between prevalence of malignant transformation and various demographic and clinical characteristics was studied. Various characteristics of OLP cases with malignant transformation are given in Table 5. Both cases of OSCC occurred in the erosive variety of OLP occurring in the buccal mucosa in female patients with the age of 48 years and above.

Discussion

The present retrospective study attempted to elucidate the epidemiological and clinicopathological characteristics of 143 patients attending the OPD of Kalinga Institute of Dental Sciences, Bhubaneswar, who were histopathologically diagnosed as OLP. The strength of the present study was that it was one of the very few studies done in India to evaluate the presence of dysplasia in OLP cases and associated malignant transformation. Our findings add on to the very limited data available regarding OLP and rate of malignant transformation in Indian population. In spite of the several limitations of retrospective studies, they are useful in evaluating patient populations.[3]

Table 3: Comparison of male and female patients in terms of different demographic, clinical, and pathological characteristics

Factors	Male (%)	Female (%)	Total (%)	χ^2	*P*
Age groups (years)					
18-27	24 (75.00)	8 (25.00)	32 (22.38)	12.4880	0.0140*
28-37	22 (50.00)	22 (50.00)	44 (30.77)		
38-47	18 (54.55)	15 (45.45)	33 (23.08)		
48-57	4 (23.53)	13 (76.47)	17 (11.89)		
58+	10 (58.82)	7 (41.18)	17 (11.89)		
Site					
Buccal mucosa (bilateral)	61 (53.51)	53 (46.49)	114 (79.72)	18.3090	0.0060*
Buccal mucosa tongue	0	3 (100.00)	3 (2.10)		
Left alveolar mucosa	4 (100.00)	0	4 (2.80)		
Left buccal mucosa	4 (100.00)	0	4 (2.80)		
Lower labial mucosa	2 (50.00)	2 (50.00)	4 (2.80)		
Right buccal mucosa	7 (77.78)	2 (22.22)	9 (6.29)		
Tongue	0	5 (100.00)	5 (3.50)		
Clinical types					
Erosive	12 (40.00)	18 (60.00)	30 (20.98)	3.2400	0.0720
Reticular	66 (58.41)	47 (41.59)	113 (79.02)		
Site of biopsy					
Left alveolar mucosa	2 (100.00)	0	2 (1.40)	17.4050	0.0020*
Left buccal mucosa	38 (71.70)	15 (28.30)	53 (37.06)		
Lower labial mucosa	2 (50.00)	2 (50.00)	4 (2.80)		
Right buccal mucosa	36 (46.15)	42 (53.85)	78 (54.55)		
Tongue	0	6 (100.00)	6 (4.20)		
Systemic diseases					
No	61 (62.24)	37 (37.76)	98 (68.53)	17.7240	0.0030*
DM	5 (26.32)	14 (73.68)	19 (13.29)		
DM hypertension	7 (58.33)	5 (41.67)	12 (8.39)		
Hypertension	5 (71.43)	2 (28.57)	7 (4.90)		
Hypothyroidism	0	2 (100.00)	2 (1.40)		
Rheumatoid arthritis	0	5 (100.00)	5 (3.50)		
Pigmentation					
Absent	56 (62.22)	34 (37.78)	90 (62.94)	5.7720	0.0160*
Present	22 (41.51)	31 (58.49)	53 (37.06)		
Lichen planus without dysplasia					
Absent	4 (36.36)	7 (63.64)	11 (7.69)	1.5890	0.2070
Present	74 (56.06)	58 (43.94)	132 (92.31)		
Lichen planus with dysplasia					
Absent	74 (56.06)	58 (43.94)	132 (92.31)	1.5890	0.2070
Present	4 (36.36)	7 (63.64)	11 (7.69)		

*$P<0.05$. DM=Diabetes mellitus

The clinical features of patients in our study shared several similarities and dissimilarities with other previously reported studies. In our study, we obtained a male predilection (54.55%) which was in accordance with the study done by Munde *et al*.[3] However, Shen *et al*., Eisen, Xue *et al*., Thorn *et al*., Bermejo-Fenoll *et al*., Irani *et al*., Tovaru *et al*., and Budimir *et al*. reported a female predilection and hence their results were not in accordance with our study.[4,11-17] Most of our patients were in the third decade of life, which is lower than the mean age reported in Czech Republic (55.2 years), Central China (50.4 years), Spain (56.4 years), Iran (44.5 years), Romania (52 years), UK (52.0 years), and Italy (56.7 years).[5,12,14-16,18,19] The probable explanation for this may be the geographic and ethnic differences.

In our study, bilateral presentation of OLP in the buccal mucosa (79.72%) was the most common which was in accordance with the studies done by Munde *et al*., Shen *et al*., Radochová *et al*., Oliveira Alves *et al*., Irani *et al*., and Tovaru *et al*.[3-5,8,15,16] Unilateral occurrence of lichen planus was observed in few of our cases, which clinically mimics another condition

Table 4: Association between prevalence of oral lichen planus (with and without dysplasia) and different demographic and clinical parameters

Factors	With dysplasia (%)	Without dysplasia (%)	Total (%)	χ^2	*P*
Age groups (years)					
18-27	2 (6.25)	30 (93.75)	32 (22.38)	18.4370	0.0010*
28-37	0	44 (100.00)	44 (30.77)		
38-47	1 (3.03)	32 (96.97)	33 (23.08)		
48-57	3 (17.65)	14 (82.35)	17 (11.89)		
58+	5 (29.41)	12 (70.59)	17 (11.89)		
Gender					
Male	4 (5.13)	74 (94.87)	78 (54.55)	1.5890	0.2070
Female	7 (10.77)	58 (89.23)	65 (45.45)		
Site					
Buccal mucosa (bilateral)	6 (5.26)	108 (94.74)	114 (79.72)	14.1250	0.0280*
Buccal mucosa tongue	1 (33.33)	2 (66.67)	3 (2.10)		
Left alveolar mucosa	0	4 (100.00)	4 (2.80)		
Left buccal mucosa	0	4 (100.00)	4 (2.80)		
Lower labial mucosa	0	4 (100.00)	4 (2.80)		
Right buccal mucosa	3 (33.33)	6 (66.67)	9 (6.29)		
Tongue	1 (20.00)	4 (80.00)	5 (3.50)		
Clinical types					
Erosive	8 (26.67)	22 (73.33)	30 (20.98)	19.2490	0.0001*
Reticular	3 (2.65)	110 (97.35)	113 (79.02)		
Site of biopsy					
Left alveolar mucosa	0	2 (100.00)	2 (1.40)	7.3820	0.1170
Left buccal mucosa	2 (3.77)	51 (96.23)	53 (37.06)		
Lower labial mucosa	0 (0.00)	4 (100.00)	4 (2.80)		
Right buccal mucosa	7 (8.97)	71 (91.03)	78 (54.55)		
Tongue	2 (33.33)	4 (66.67)	6 (4.20)		
Systemic diseases					
No	4 (4.08)	94 (95.92)	98 (68.53)	6.5770	0.2540
DM	3 (15.79)	16 (84.21)	19 (13.29)		
DM hypertension	2 (16.67)	10 (83.33)	12 (8.39)		
Hypertension	1 (14.29)	6 (85.71)	7 (4.90)		
Hypothyroidism	0 (0.00)	2 (100.00)	2 (1.40)		
Rheumatoid arthritis	1 (20.00)	4 (80.00)	5 (3.50)		
Total	11 (7.69)	132 (92.31)	143 (100.00)		

*$P<0.05$. DM=Diabetes mellitus

Table 5: Characteristics of oral lichen planus cases with malignant transformation

Case	Age (years)	Gender	OLP clinical type	H/P	Site of OLP	Latency (months)	Tumor type	Tumor site	Smoking or alcohol use
1	69	Male	Erosive	OLP with moderate dysplasia	Buccal mucosa (bilateral)	46	Well differentiated OSCC	Right buccal mucosa	No
2	55	Female	Erosive	OLP with moderate dysplasia	Buccal mucosa (bilateral)	39	Well differentiated OSCC	Right buccal mucosa	No

H/P=Histopathology, OSCC=Oral squamous cell carcinoma, OLP=Oral lichen planus

known as lichenoid reaction. Although they also show few similarities histopathologically, lichenoid reaction can be differentiated from lichen planus on the basis of subepithelial as well as diffuse infiltration of inflammatory infiltrate with substantial numbers of plasma cells, eosinophils, and neutrophils in contrast to only a subepithelial band of lymphocytes in the latter.[20]

Reticular type (79.02%) was the most common clinical type encountered which was in concordance with the studies done by Munde *et al*., Shen *et al*., Radochová *et al*., Oliveira Alves *et al*., Tovaru *et al*., and Budimir *et al*.[3-5,8,16,17] However, Irani *et al*. reported erosive form to be the most common type in Iranian population.[15]

Table 6: Systematic review of studies done on oral lichen planus and its rate of malignant transformation

Study	Author's	Country	Year	Number of cases	Cases showing malignant transformation	Malignant transformation rate (%)
1	Bandyopadhyay *et al*. (present study)	India	2017	143	2	1.4
2	Irani *et al*.[15]	Iran	2016	112	1	0.89
3	Radochová *et al*.[5]	Czech Republic	2014	171	Nil	0
4	Budimir *et al*.[17]	Croatia	2014	563	4	0.7
5	Munde *et al*.[3]	India	2013	128	Nil	0
6	Tovaru *et al*.[16]	Romania	2013	633	6	0.95
7	Gümrü[36]	Turkey	2013	370	1	0.2
8	Bardellini *et al*.[37]	Italy	2013	204	2	0.98
9	Bombeccari *et al*.[38]	Italy	2011	327	8	2.4
10	Shen *et al*.[4]	China	2012	518	5	0.96
11	Kaplan *et al*.[35]	Israel	2012	171	10	5.8
12	Oliveira Alves *et al*.[8]	Brazil	2010	110	Nil	0
13	Torrente-Castells *et al*.[39]	Spain	2010	65	2	3.1
14	Thongprasom *et al*.[40]	Thai	2010	533	1	0.2
15	Fang *et al*.[9]	China	2009	2119	23	1.1
16	Bermejo-Fenoll *et al*.[14]	Spain	2009	550	5	0.9
17	Pakfetrat *et al*.[41]	Iran	2009	420	3	0.07
18	Carbone *et al*.[42]	Italy	2009	808	15	1.8
19	Kesic *et al*.[32]	Serbia	2009	163	2	1.2
20	Thongprasom *et al*.[43]	Thai	2009	175	1	0.57
		Croatia		175	Nil	0
21	Zhang and Zhou[44]	China	2007	724	15	2.1
22	van der Meij *et al*.[45]	Holland	2007	67	Nil	0
23	Hsue *et al*.[46]	Taiwan	2007	143	3	2.1
24	Ingafou *et al*.[18]	UK	2006	690	13	1.9
25	Bornstein *et al*.[7]	Switzerland	2006	145	4	2.8
26	Xue *et al*.[12]	China	2005	674	4	0.6
27	Laeijendecker *et al*.[47]	Holland	2005	200	3	1.5
28	Al-Bayati[48]	Baghdad	2012	123	4	3.3
29	Rödström *et al*.[49]	Sweden	2004	1028	5	0.5
30	Gandolfo *et al*.[19]	Italy	2004	402	9	2.2
31	van der Meij *et al*.[50]	Holland	2003	62	Nil	0
32	Lanfranchi-Tizeira *et al*.[34]	Argentina	2003	719	32	6.5
33	Eisen[11]	USA	2002	723	6	0.8
34	Chainani-Wu *et al*.[31]	USA	2001	229	4	1.7
35	Mignogna *et al*.[51]	Italy	2001	502	24	3.7
36	Rajentheran *et al*.[30]	UK	1999	832	7	0.8
37	Lo Muzio *et al*.[33]	Italy	1998	263	14	4.9
38	Silverman and Bahl[52]	USA	1997	95	3	3.2
39	Markopoulos *et al*.[29]	Greece	1997	326	4	1.3
40	Gorsky *et al*.[28]	Israel	1996	157	2	1.3
41	Rode *et al*.[53]	Slovenia	2000	75	Nil	0
42	Moncarz *et al*.[54]	Israel	1993	280	6	2.1
43	Barnard *et al*.[55]	UK	1993	241	8	3.3
44	Voûte *et al*.[56]	Holland	1992	113	3	2.7
45	Sigurgeirsson and Lindelöf[57]	Sweden	1991	2071	8	0.4
46	Silverman *et al*.[58]	USA	1991	214	5	2.3
47	Salem[59]	Saudi Arabia	1989	72	4	5.67
48	Holmstrup *et al*.[60]	Denmark	1988	611	9	1.5

About 68.53% of the patients in our study did not show any associated systemic illness. On the other hand, DM was the most common systemic illness encountered followed by concomitant presence of DM

and hypertension. This finding may support the literature claim of correlation of OLP with DM.[21]

The associated hyperpigmentation in oral mucosa has been attributed to postinflammatory changes, which results in increased melanin pigmentation and abnormal distribution of melanin and melanophages.[22-24] About 37.06% of patients showed associated hyperpigmentation, with males being more commonly affected and buccal mucosa being the most common site. Patients with Type 2 DM showed greater incidence of hyperpigmentation. Munde *et al*. reported almost a similar prevalence rate (29.69%) of hyperpigmentation whereas Chitturi *et al*. reported a higher rate (60%) of associated hyperpigmentation.[3,25]

In our study, of 143 patients, 11 (7.69%) showed evidence of dysplasia (seven mild dysplasia; four moderate dysplasia) whereas Munde *et al*. reported a lower prevalence rate of 3.13% which was consistent with the reports of Murti *et al*.[3,26] On a higher end, Irani *et al*. reported dysplastic changes in 10.71% of their cases.[15] Most of the dysplastic changes were associated with erosive variant in all the studies. Krutchkoff and Eisenberg in the year 1985 proposed the term "lichenoid dysplasia" to characterize cases that on microscopy had both features of OLP and epithelial dysplasia. However, the WHO does not classify "lichenoid dysplasia" as a separate entity.[27]

A malignant transformation rate of 1.4% was reported in our study which was in consonant with the studies of Shen *et al*., Fang *et al*., Eisen, Gorsky *et al*., Markopoulos *et al*., Rajentheran *et al*., Chainani-Wu *et al*., and Kesic *et al*.[4,9,11,28-32] On the other hand, Lo Muzio *et al*., Lanfranchi-Tizeira *et al*., and Kaplan *et al*. reported a higher malignant transformation rate of 4.9%, 6.5%, and 5.8% in Italian, Argentinian, and Israeli population, respectively.[33-35] In the Indian scenario, Munde *et al*. did not report any malignant transformation in their cases.[3] The only limitation in our study is the smaller sample size. There were no controversies raised by the study. A systematic review was done for studies on OLP and its malignant transformation which is tabulated in Table 6.

Conclusion

The prevalence study was first of its kind in Eastern India to elucidate the epidemiological, clinicopathological characteristics, and malignant transformation in patients with OLP. The primary outcome of the study revealed dysplastic changes in 7.69% of our cases and 72.7% of these cases were associated with erosive clinical type. Two of our cases showed malignant transformation over an average period of 3.5 years. Moreover, the secondary outcome constituted the predominance of OLP among middle-aged male population and the prevalence of bilateral involvement of buccal mucosa. Reticular lesions were the most frequent followed by erosive form. More number of studies with larger sample size and long-term follow-up should be taken up to estimate the innate prospective of OLP to turn neoplastic. Multivariate logistic regression analysis of malignant transformation in OLP can be done to determine the independent predictive factors. The outcome of this study emphasizes the role of clinical follow-up of patients with OLP.

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Conflicts of interest

There are no conflicts of interest.

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