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Research Article

IS THE SERUM ZINC LEVEL AFFECTS THE TYPE AND SITE OF OCCURRENCE OF ORAL LICHEN PLANUS-A PROSPECTIVE CASE CONTROL STUDY

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A B S T R A C T

Aims and objectives: This study aims atevaluation of correlation of serum Zn level and types of oral lichen planus and site of occurrence of oral lichen planus.
***Materials and Methods*:** A total of 30 patients with oral lichen planus and 30 healthy individuals as the control group were recruited in this study. In a patient with clinically and histopathologically confirmed case of oral lichen planus 20mg Zinc (in form of`zinconia' tablets) is given once a daily from baseline(0 day), 15 days, 30 days and 45 days. The 5ml blood from each patient is collected at baseline (0 day), 15 days, 30 days and 45 days by venipuncture. The serum Zn level is analysed by Inductively Couple Plasma (ICP) protocolat baseline (0 day), 15 days, 30 days and 45 days.
Results: Reticular type (40%) is the most common type of oral lichen planus and most commonly found on right and left buccal mucosa (60%) in study population. Mean serum Zinc level is statistically not significant (p>.05) with type of oral lichen planus. It was also found that the mean serum Zinc level is not significantly (p>.05) associated with site of occurrence.
Conclusion: The reticulartype is most common form of oral lichen planus. The buccal mucosa is most common site of occurrence of oral lichen planus. The occurrence of type of oral lichen planus and site of occurence is independent of serum Zinc level.

INTRODUCTION

Lichen planus is a chronic, autoimmune [1,2]disease that can affect the skin as well as the mucous membranes[3]. It can appear clinically as white reticular keratotic changes, erythematous changes, and erosions[4] on involving the oral mucosa. Oral lichen planus can occur on any mucosal surface, including the lips, but most frequently occurs on the buccal mucosa. There are six clinical forms of lichen planus of oral mucosa and vermilion: typical, hyperkeratotic, exudative-rubefacient, erosive-ulcerative, bullous and atypical[5]. The erosive-ulcerous form of LP OM proceeds hard with pronounced exudative manifestations, formation of erosions or ulcers, frequent relapses. It has high risk of oncogenic transformation (in 0 to 3.5% of cases), accompanied by significant painfulness and torpidity, polymorphism of clinical manifestations and low efficiency of treatment[6,7-9].The Indian subcontinent has a particularly high incidence of disease[10]. LP is estimated to affect 0.5% to 2.0% of the general population[11], the prevalence being ranging from 0.5% selectively in Japanese population, 1.9% in Swedish population, 2.6% in Indian population and 0.38% in Malaysia (relatively uncommon)[12].

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The relative risk is 3.7% in people with mixed oral habits, lowest (0.3%) in non-users of tobacco and highest (13.7%) among those who smoked and chewed tobacco[13]. This disease has most often been reported in middle-aged patients with 30-60 years of age and is more common in females than in males. Zinc is one of the most essential elements in growth and development of epithelium moreover it is a requisite element for cellular function and metabolism of carbohydrates, proteins and lipids[14,15]. The role of zinc in modulating oxidative stress has recently been recognized. Oxidative stress is an important contributing factor in several chronic human diseases, such as atherosclerosis and related vascular diseases, mutagenesis and cancer, neurodegeneration, immunologic disorders like lichen planus, and the aging process[16-18]. Together O, H O and OH are known as reactive oxygen species (ROS) and these are produced continuously in vivounder aerobic conditions. The NADPH oxidases are a group of plasma membrane associated enzymes which catalyze the production of O from oxygen by using NADPH as the electron donor. Zinc is an inhibitor of this enzyme. The dismutation of O to H O is catalyzed by an enzyme super oxide dismutase (SOD) which contains both copper and zinc. Zinc is known to induce the production of metallothionein which is very rich in cysteine and is an excellent scavenger of OH[19]. Iron and copper ions actuate the production of .OH from H O. Zinc is known to compete with both iron and copper for binding to cell membrane thus

decreasing the production of OH[19]. In India there is a scarcity of studies and researches regarding role of zinc element in oral lichen planus. Therefore the present study is undertaking to correlate between serum Zn level and types of oral lichen planus and its site of occurrence.

MATERIALS AND METHODS

The present study has been conducted from May 2017 to May 2018**.** A total of 30 patients with oral lichen planus and 30 healthy individuals as the control group were recruited in this study. All participants were selected from the Department of Oral Medicine and Radiology, King George's Medical University, Lucknow. 18-60 years old subjects having clinically and histopathologically diagnosed oral lichen planus were included in the study. The patients having any factor related to lichenoid reaction such as amalgam fillings near the lesion, consumption of medication which are associated with lichenoid reaction, patients whose histopathological findings shows dysplastic changes, consumptions of drugs other than zinconia that would influence the level of serum zinc level, patient not interested in the study, patients with malabsorption problem, presence of other factors that would affect the absorption of zinc like intake of calcium, iron supplements, pregnancy etc, Patients consuming alcohol were excluded from study.

In a patient with clinically and histopathologically confirmed case of oral lichen planus 20mg Zinc (in form of'zinconia' tablets) is given once a daily from baseline(0 day), 15 days, 30 days and 45 days. The 5ml blood from each patient is collected at baseline (0 day), 15 days, 30 days and 45 days by venipuncture. The serum Zn level is analysed by Inductively Couple Plasma **(**ICP) protocol at baseline (0 day), 15 days, 30 days and 45 days. The serum was diluted with Mili-Q water in a ratio of 1:3. The resultant clear solution was then analysed by Inductively Couple Plasma-Optical Emission Spectrometer (ICP-OES) (Optima 8000, Perkin Elmer, USA).

Operating Conditions	Value
Plasma Gas Flow (L/min)	8
Auxiliary Gas Flow (L/min)	0.2
Carrier Gas Flow (L/min)	0.55
RF Power [W]	1300
Plasma view	Axial
Sample flow rate (ml/min)	1.5

The values of Zn serum level will be recorded in structured Performa for the same. SPSS 21v version will be used for data analysis.

RESULTS

In the study population (N=30), at baseline (0 day) the minimum serum Zinc level is .00318mmol/l and maximum zinc serum level is 01054 mmol/l. However the mean Serum Zinc level in 30 study subjects were .0047360+.00144255mmol/l. (Table.1).

Table 1 Showing the Maximum and Minimum Zn level (mmol/l) in study population

	N	Minimum	Maximum	Mean	Std. Deviation
Zn level 0 day	30	.00318	.01054	.0047360	.00144255

In study population, Reticular type (40%) is the most common type of oral lichen planus followed by erosive lichen planus (30%), atrophic lichen planus (20%) and bullous type (10%) (Table.2).

Table 2 Shows the frequency of Type of Oral Lichen Planus

Type of Oral Lichen Planus	N	Percent
Atrophic oral lichen planus	6	20.0
Bullous oral lichen planus	3	10.0
Erosive oral lichen planus	9	30.0
Reticular oral lichen planus	12	40.0
Total	30	100.0

In the study population (N=30), oral lichen planus is most commonly found on right and left buccalmucosa (60%) followed by mandibular and maxillary gingival (16.7%), right buccal mucosa (6.7%) left buccal mucosa (6.7%), tongue (6.7%) and lower lip(3.3%) (Table.3).

Table 3 Shows the frequency of site of occurrence

Site of Occurrence	N	Percent
Left buccal mucosa	2	6.7
Lower lip	1	3.3
Mandible and maxillary gingiva	5	16.7
Right buccal mucosa	2	6.7
Right and left buccal mucosa	18	60.0
Tongue	2	6.7
Total	30	100.0

The mean serum Zinc level in study population and type of oral lichen planus has been co-related by using one way ANOVA. It was found that mean serum Zinc level is statistically not significant (p>.05) with type of oral lichen planusi.e the occurrence of type of oral lichen planus is independent of serum Zinc level. However at the base line (0 day), the highest mean serum Zinc level (.00479mmol/l) with Reticular type of oral lichen planus followed by atrophic type(.00473mmol/l), Erosive type (.0040mmol/l) and bullous type(.0064mmol/l) of oral lichen planus (Table.4).

Table 4 Shows the co-relation between type of oral lichen planus and mean serum Zn level(mmol/l) at base line (0 day)

Type of Oral Lichen Planus	N	Mean(mmol/l)	Std. Deviation	p-value
Atrophic oral lichen planus	6	.0047317	.00086539	
Bullous oral lichen planus	3	.0064933	.00352959	
Erosive oral lichen planus	9	.0040789	.00047858	0.088
Reticular oral lichen planus	12	.0047917	.00123090	

The mean serum Zinc level at baseline (0 day) is compared with site of occurrence in oral cavity by one way ANOVA. It was concluded that the mean serum Zinc level is not significantly (p>.05) associated with site of occurrence i.e the site of occurrence of oral lichen planus is independent of serum Zinc Level. However the highest mean serum Zinc level is reported in oral lichen planus involving Tongue (.0048mmol/l) followed by right buccal mucosa (.00469mmol/l), Right and Left buccal Mucosa (.00464mmol/l), mandibular and maxillary gingival

(.0041mmol/l), lower lip(.00627mmol/l)and left buccal mucosa (.0062mmol/l). (Table.5)

Table 5 Shows the co-relation between site of occurrence of Oral lichen planusmean serum Zn level(mmol/l) at base line (0 day)

Site of Occurrence	N	Mean(mmol/l)	Std. Deviation	p-value
Left buccal mucosa	2	.0062000	.00145664	
Lower lip	1	.0062700	.	
Mandible and maxillary gingiva	5	.0041280	.00053923	0.558
Right buccal mucosa	2	.0046900	.00077782	
Right and left buccal mucosa	18	.0046483	.00165182	
Tongue	2	.0048600	.00118794	

DISCUSSION

Zinc enhances the enzyme activity contributes to protein structure, and regulates gene expression[20]. It is cofactor for polymerases and proteases involved in many cellular functions such as wound repair and intestinal epithelial cell regeneration[21,22].It is believed that zinc interact with taurine and vitamin A and has antioxidant effects which may protect macular degeneration caused by oxidative stress[23]. The same effect may be considered in the process of the cellular degeneration cause by lichen planus. Zinc deficiency is associated with impaired wound healing and the other effect is inhibition and stimulation on lymphocyte reaction. Thymic epithelial cells secrete thymic hormones that have an impact on the maturation of Tlymphocytes. One of these peptides thymulin requires zinc as a cofactor and in an equal molarity ratio for biological activity[22]. The same influence on T-lymphocytes may perhaps be concerned in the process of immunologic-based diseases like lichen planus. Haase *et al*[24] stated that in zinc deficiency conditions, the function, development and the polarization of T-lymphocytes into effectors are disrupted. This process leads to reduction in T-cell numbers, decreased ratio of type 1 /type 2 T-helper cells (with reduced production of T-helper type 1 cytokines like interferon-gamma) and compromised T-cell mediated immune defense.

There were limited studies available reporting the zinc level in oral lichen planus so this study might be a milestone in research field regarding lichen planus. In present study it was observed that Reticular type (40%) is the most common type of oral lichen planus followed by erosive lichen planus (30%), atrophic lichen planus (20%) and bullous type (10%). On contrary Mostafa *et al*[25] had conducted a study and stated that the red type of oral lichen planus (atrophic and erosive lesions) was predominant in the egyptian sample of patients (59.37% of patients had atrophic oral lichen planus meanwhile 20.3% developed erosive type of oral lichen planus which was not in agreement with a study conducted worldwide that found prevalence of the white forms of oral lichen planusin 66.9% in a study performed by Cekie-Arambasin *et al*[26] 88.5% in another study conducted by Persic *et al*[27] . It was also observed that oral lichen planus was most commonly found on right and left buccal mucosa (60%) followed by mandibular and maxillary gingival (16.7%), right buccal mucosa (6.7%) left buccal mucosa (6.7%), tongue(6.7%) and lower lip(3.3%) and it was also supported by the findings of previous studies done by Tovaru *et al*[28], Ingafou *et al*[29],Castells *et al*[30] and fenoll *et al*[31] . On correlating the mean serum Zinc level and type of oral lichen planus, it was depicted that mean serum zinc level was statistically not significant (p>.05) with type of oral lichen planus that means the occurrence of type of oral lichen planus was independent of serum zinc level.

There were very limited studies regarding comparison of seum zinc levels to types of oral lichen planus. So, the data and outcomes from the present study might be beneficial to future prospects regarding diagnosis and epidemiology of oral lichen planus and its types.

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