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NITRIC OXIDE LEVELS AND STRESS IN PATIENTS WITH LICHEN PLANUS : A COMPARATIVE STUDY

Dr. Sanjay Sakarwal

Assistant Professor, Dermatology Venereology & Leprosy (Skin & VD, National Institute of Medical Science & Research, Jaipur Rajasthan.

ABSTRACT

Background: Although psychosomatic aspects are linked to dermatological illnesses, their significance in oral lichen planus (OLP) is still up for debate. The objective is to assess salivary NO levels, psychosocial stresses, and their relationships to the etiology of OLP.

Materials and Methods: Two groups were included in the study: Group II included the control group (n=35) and Group I included the individuals with OLP group (n=35). Stress levels were assessed using the DASS Scale and Griess Reagent on the patients' saliva, respectively.

Results: It was determined that the difference in the NO level averages was highly significant (P 0.05). The optical density (OD) readings and stress level were found to be extremely significant when compared between groups.

Conclusion: Stress and salivary NO have a key role in the etiology of OLP.

Key words: Lichen planus, stress, and depression.

INTRODUCTION:

The skin, vaginal mucosa, scalp, nails, and regions of the oral cavity can all be affected by the common, chronic inflammatory mucosal condition known as oral lichen planus (OLP).1,2 It has been discussed how chronic inflammation and cancer are related.3 Nitric oxide (NO), which is produced by reactive nitrogen species (RNS), is thought to be a crucial player in inflammation-mediated carcinogenesis. Free radical gas nitric oxide is toxic in the atmosphere but works as a physiological and pathophysiological mediator in the body at modest, controlled quantities. Nitric oxide has two biological roles that are now understood: first, it relaxes the vascular smooth muscle that is derived from the endothelium, and second, it is a cytotoxic molecule that affects the capacity of cells to kill bacteria, viruses, protozoa, and cancer cells. Furthermore, it is widely known that nitric oxide damages cellular proteins, DNA, and lipids, ultimately causing cell death, tissue damage, and organ failure.4 The goal of the current investigation was to determine the relationship between psychosocial stressors and salivary NO levels in the development of OLP.

Materials and Methods

Saliva samples from patients who visited the college's outpatient department (OPD) were used in the study. Two groups were included in the study: Group II included the control group (n = 35) while group I included the participants with OLP group (n = 35). All patients and volunteers who volunteered to be examined gave their approval. The Institutions Ethical Committee approved the study. Clinically and histopathologically verified Lichen Planus patients between the ages of 20 and 45 were chosen. Selection criteria for the control group (II) Age range the same as group I individuals (20–45), patients having impacted third molars prophylactically removed for orthodontic treatment, clear of any inflammation, and free of any systemic illnesses. Using the Depression Anxiety Stress Scale (DASS), stress was assessed. A potential test for depression, anxiety, and stress is the DASS analysis of stress. The stress levels of people with OLP were measured using this scale. Griess reagent, which was made using 1% sulfanilamide, 1% naphthylethylene diamine dihydrochloride, and 2.5% phosphoric acid, was used to react these solutions. As it reacts with surface air nitrogen, the Griess reagent is extremely unstable. As a result, it had just been made before use. To achieve a thorough reaction, 0.5 ml of the produced standard solutions of sodium nitrite were combined with an equal volume of Griess reagent in Eppendorf tubes. The tubes were then incubated

**Corresponding author: Dr. Sanjay Sakarwal |*

at room temperature for 10 minutes. After the combination had reacted, it was loaded into plastic cuvettes for measurement in the spectrophotometer, which is connected to a computer to allow for the taking of digital results. These measurements for the standard solutions were used to create a graph of absorbance vs concentration that served as the basis for the standard curve. The samples from the 50 participants were similarly treated with Griess reagent, transferred to a spectro-photometer, and their optical densities (OD) were noted. Following the correlation of the optical densities in the standard curve, matching nitrite concentrations were noticed. Mol/L was used to represent NO. Lichen planus was identified by biopsy procedures. The Statistical Package for Social Sciences (SPSS) was used to statistically analyze the results that were collected.

Results

35 OLP patients were subjected to measure NO levels. The intergroup comparison of OD values of the two groups was found to be highly significant. Keeping the salivary NO as constant factor, NO was correlated to the increase in age of the patient using Pearson's correlation; however, the results werestatistically insignificant.

Table 1: Assessment of difference in the mean salivary nitric oxide levels between the two groups

Groups	Mean±S.D NO (µM/L)	p value
I	12.21±3.04	0.01 (p<0.0.5)
II	8.80±1.43	

The mean NO levels in saliva of OLP was observed to be 82.89 ± 17.02 mM/L as compared to mean of 10.81±3.42 mM/L NO levels in healthy control.The comparison of depression, anxiety, and stress scales between the two groups; group I (OLP) and group II (healthy controls) showed a definitive increase in depression levels between the two groups.

Table 2: Assessment of mean of depression levels between the two group

Groups	Mean±S.D NO (µM/L)	P value
I	82.89±17.02	0.012 p<0.0.5)
II	10.81±3.42	

A mean of 10.78±1.08 as compared to meanof 9.81±0.42 in group II, and was statistically significant (P < 0.05); whereas, the anxiety and stress scales of group I and group II were insignificant as well (P > 0.05).

Table 3: Assessment of means of anxiety levels between the two groups

Groups	Mean±S.D NO (µM/L)	p value
I	10.78±1.08	0.065 p>0.0.5)
II	9.81±0.42	

Table 4: Assessment of means of stress levels between the two groups

Groups	Mean±S.D NO (µM/L)	p value
I	12.32±4.02	0.076 p>0.0.5)
II	10.80±3.42	

Discussion

Since Wilson's initial description of the condition, lichen planus has been a contentious topic.5 In our study, when we compared the levels of salivary NO in OLP patients with the control group, we discovered a substantial rise in salivary NO levels in OLP patients compared to the control group (P 0.05).6 We postulated that T cells from OLP tissues produced more interleukin (IL)-6 and GM-CSF, which in turn created more TNF-, IL-1b, IL-6, and GM-CSF, which in turn enhanced synthesis of NOS, which is responsible for releasing NO. Increased

NOS activity interacts with the caspase family of enzymes to promote apoptosis, which was histopathologically observed as basal cell degeneration in OLP. According to Moncad et al.7, increased chronicity (inflammation potential) and the release of proinflammatory cytokines (IL-1, TNF, etc.) are important catalysts for the activation of NO (iNOS), which produces NO, which then mediates DNA damage either directly or indirectly through the production of more persistent RNS. Furthermore, Ohashi et al.8 demonstrated that an elevation in NO significantly harmed in vitro fibroblasts, keratinocytes, and oral epithelial cells. Therefore, the elevated salivary NO levels can be linked to inflammatory or infectious circumstances that cause iNOS to be overexpressed. As a result, an elevated NO could contribute to the elevated cellular infiltration found in various kinds of OLP.9 The term "stress" refers to the impact that environmental and psychological factors have on one's physical and mental health.9 It has a significant impact on immune-mediated illnesses and disease processes. Stress phenomenon can occasionally be linked to inflammation, infection, autoimmune processes, and even the beginning and growth of malignant tumors. So, utilizing DASS, the impact of stress on OLP patients was examined. According to the findings, there was a significantly higher rate of depression in OLP patients compared to the control group (P 0.05) on the depression scale (Table 2a). Despite the fact that OLP patients' scores on the anxiety and stress measures were higher than those of the control group, these scores did not statistically differ from those of the control group (P > 0.05).

McCartan10 investigated the psychological aspects of OLP. Some OLP sufferers experience anxiety, while others deal with depression. More than half of his OLP patients reported experiencing significant levels of stress linked to their jobs, relationships, and losses, either before or at the time the disorder manifested itself, according to other authors. According to the theory that glucocorticoids can influence lymphocyte subsets and promote a shift between Th1/Th2 cytokines, while preferentially suppressing nonactivated lymphocytes, thereby promoting IL-2 expression during clonal growth, stress as a pathogenic factor in OLP can be explained.10 Furthermore, because proinflammatory cytokines are powerful neuroendocrine response stimulators, significant depression has been linked to inflammation.11 The following conclusions were therefore suggested: One pathogenic pathway involves free radicals, particularly NO, and an excess of salivary NO has a pathophysiological impact on OLP. Cell death, tissue damage, and organ failure can result from the NO (iNOS) activating the inflammatory cytokine, which has harmful effects against cellular proteins, DNA, and lipids. As a result, biochemical evaluation of patients with OLP can help to refine therapeutic strategies and provide guidance when evaluating the lesion's risk for malignancy.11

Conclusion: Stress and salivary NO have a key role in the etiology of OLP. Further theories include the possibility that these stressors serve as a trigger for a number of autoimmune reactions, which have been linked to the pathophysiology of OLP. Before firm findings can be made, more longitudinal research must be conducted globally.

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