

Evaluation of Salivary Lactate Dehydrogenase in Oral Submucous Fibrosis & Its Correlation with Clinical Submucous Fibrosis

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Abstract: ***Introduction:** Oral submucous fibrosis (OSMF) is a premalignant condition characterized by juxta epithelial inflammatory reaction, increased deposition of sub mucosal collagen and formation of fibrous bands in the oral mucosa which results in difficulty in mouth opening. **Aim:** To assess whether Salivary Lactate Dehydrogenase can be an effective biomarker for identifying dysplastic changes associated with oral submucous fibrosis and also to assess if any correlation exist between salivary LDH levels and clinical stage of oral submucous fibrosis. **Methodology:** 15 patients with OSMF (group A) were selected as study group and 15 healthy patients were selected as controls (group B). Salivary LDH level assessment and clinical staging of the OSMF were done and compared between the groups. **Results:** salivary LDH was greater in group A than group B. The mean LDH value of patients with grade I OSMF 270.14 U/L; the mean LDH value of patients with grade II OSMF 554.37 U/L. The mean LDH value in control group were 229 U/L. Higher LDH values were seen in OSMF grade II than grade I. Among the OSMF patients, LDH was found to be higher in patients with more severe stages of OSMF though the difference was statically significant. **Conclusion:** Our study showed, salivary LDH was good biomarker shows good correlation with staging of OSMF.*

Keywords: Oral submucous fibrosis, salivary lactate dehydrogenase, saliva, premalignant conditions

1. Introduction

Oral submucous fibrosis (OSMF) is a premalignant condition characterized by juxta epithelial inflammatory reaction, increased deposition of sub mucosal collagen and formation of fibrous bands in the oral mucosa which results in difficulty in mouth opening¹. Etiological factors include local irritants such as chili, areca nut and tobacco habits. Systemic factors include nutritional deficiency, malnourishment, genetic factors and auto immunity. Areca nut chewing is usually considered as the most common etiopathogenesis factor of OSMF.¹

Lactate Dehydrogenase (LDH) is an enzyme that is found in the cytoplasm of most body tissues. It catalyze the oxidation of pyruvate to lactate in anaerobic conditions.² Lactate Dehydrogenase is usually confined within cell cytoplasm and becomes extracellular when a cell dies. Tissue damage and cell necrosis is associated with increased levels of LDH.³ Leakage of enzyme from even small amount of damaged tissue can increase the levels of LDH to a significant level substantiating its value as biomarker in tissue damage. Saliva collection is easier, noninvasive, and cheaper than blood collection.⁴ Although salivary gland produce salivary LDH, Oral epithelium cells are considered the major source of LDH. Increased levels of LDH are reported in cases of fibrosis and hypoxia.⁵ The present study is to evaluate changes associate with OSMF and to assess any correlation between salivary LDH levels and clinical staging of the Oral sub mucous fibrosis.

2. Methodology

All the study subject were selected from the department of Oral Medicine and Radiology, Narayana Dental College and Hospital Nellore. A total 30 patients were selected for the study divided in to two groups. Group A 15 patients with clinically diagnosed as OSMF were selected. Group B 15 health patients who are willing to participate for study were selected. Purpose of the study was explained to the patients and written informed consent was obtained from them.

Inclusion criteria:

- Patient willing to participate in the study.
- Patients who were diagnosed clinically OSMF.
- 15 healthy participants were selected.

Exclusion Criteria:

- Patients currently undergoing treatment for precancerous conditions.
- Patient receiving antioxidants, immune modulators, immune suppressants, nutritional supplements for any purpose.
- Patient with medical problems like (myocardial infraction, hepatic, renal failure, prostate disease) that can cause an alteration in the levels of LDH.

Patients with a history of malignancy were excluded from the study. A detailed history of adverse habits like areca nut, smoking, tobacco habits, alcohol was recorded. A thorough clinical examination was conducted and recorded and lesions were photographed, clinical staging of lesion was recorded based on classification of Nagesh and Bailoor

(1993)⁶. Patients were asked not to smoke or drink or eat anything one hour prior to collection of saliva⁷ and were asked to rinse the oral cavity with normal water prior to collection of saliva. A volume of 5 ml unstimulated saliva was collected in a sterile disposable container by spitting method for a period of 15 minutes. Sample is send to biochemical laboratory. Biochemical analysis is carried out by Bio system semi auto analyzer BTS - 350 and the results are statistically analyzed by SPSS software version 20.0 by independent sample T - test.

3. Results

In our study in the group A (OSMF) patients with grade I OSMF showed LDH levels with a range from 198 to 300U/L and patients with grade II OSMF showed LDH levels with a range of 430 to 600 U/L. Control group B showed LDH levels with a range from 293 to 456 U/L. Higher LDH levels were seen in OSMF grade II than grade I. The mean LDH value of patients with grade I OSMF 270.14 U/L; the mean LDH value of patients with grade II OSMF 554.37 U/L. The mean LDH value in control group were 229 U/L. Higher LDH values were seen in OSMF grade II than grade I

Table 1: Salivary LDH Levels comparison between study population and controls

	GRP	N	Mean	Std. Deviation	Std. Error Mean	T	p Value
OSMF	TEST	15	421.7333	248.66916	64.20610	2.933	.007
	Control	15	229.6000	50.48168	13.03431	2.933	.010

Table 2: Comparison of Salivary LDH Levels between OSMF Grades I & II

	GRP	N	Mean	Std. Deviation	t	p Value
OSMF	1	7	270.1429	48.933339	-2.636	.021
	2	8	554.3750	280.23813	-2.820	.024

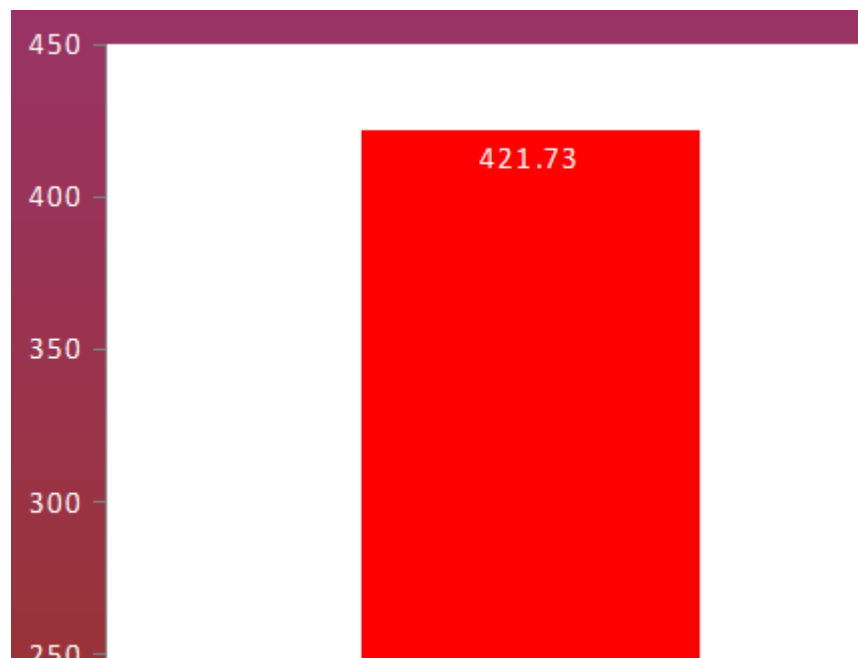


Figure 1: Comparison of salivary LDH levels between OSMF and health subjects

4. Discussion

The risk of an individual with precancerous condition for developing oral cancer is higher compared to those do not have precancer. Identification of bio marker helps identifying early stages of dysplastic changes. LDH is a biomarker that can be obtained from saliva than serum. In malignancy condition increase mitotic activity occurs which increases lactic acid production because of increase glycoprotein break down⁸. LDH levels are increased in patients with myocardial infraction, renal failure, liver diseases, and arthritis hence we excluded people with the history of above diseases⁹. Saliva collection is non invasive⁴. Isoenzymes LDH - 4 and LDH - 5 were found to be higher in saliva than in plasma⁹. LDH in saliva has been derived from exfoliated epithelial cells. LDH levels in saliva is similar to oral epithelium indicating apoptosis associated

with exfoliated epithelial cells¹⁰. Stimulation of major salivary glands increases their saliva secretions and results in diluting the whole salivary LDH with resultant reduction of LDH activity in the whole saliva is a good indicator and a useful biochemical marker in the health and disease¹¹.

M. Sivaramakrishnan et al concluded in their study that salivary LDH levels in OSMF patients was significantly higher than in the healthy subjects salivary LDH levels between OSMF cases and healthy subjects showed statically significant differences. On comparing the salivary LDH in OSMF patient with the clinical staging of OSMF, the results were not statistically significant. Although salivary LDH level was slightly increased in grade III as compared to grade II OSMF. Results were not statistically significant.⁴

Priya shirish joshi et. al concluded in their study that increased levels, of salivary and serum LDH was found in oral leukoplakia and oral squamous cell carcinoma as compared to healthy controls. Increase in LDH levels was less in saliva as compared to serum in oral leukoplakia patients. The increase in LDH levels was consistently in saliva and serum of oral squamous cell carcinoma patients¹². In our study we compared only salivary LDH in grade 1 and grade 2 OSMF.

Shishi ram Shetty e, al.. Concluded in their study that increased levels of LDH Oral leukoplakia and Oral cancer patients than in healthy individuals. In their study they were included both clinically and histologically confirmed leukoplakia and oral cancer patients. Results showed LDH levels were higher in males than in females.² Our results are in accordance to their results in which grade II OSMF shows higher levels of LDH in males than in females.

Annette M. Bhambal et, al selected patients who are confirmed clinically as OSMF between 15 to 65 years and they divided into four groups based on duration of habit less than 6 months, 6 - 12, 12 - 24 months, more than 24 months increased levels seen with severity of disease and duration of habit. They also compared between age groups increased levels was seen in second and third decade of life. In our study we selected age group between 25 to 45 years where the deleterious habit most commonly seen in second and third decade of life. Result of our study showed increase levels of salivary LDH seen in grade 1 than grade 2. No grade 3 OSMF cases were recorded in our study. Need further larger groups to access salivary LDH and to correlate with clinical stages of OSMF.

In our study salivary LDH levels are increased in OSMF patients than controls and is statistically significant but LDH levels in grade I OSMF are with in normal range.

increased salivary LDH levels seen in grade II OSMF grade III OSMF were not recorded in our study hence, correlation between clinical staging of OSMF & salivary LDH levels need further larger trails to establish a definitive relationship.

5. Conclusion

The present study we found that LDH levels have been raised in patients with OSMF than control group. Higher LDH levels were seen in patients having higher grade of premalignancy. These findings are suggestive of LDH being an effective biomarker for dysplastic changes.

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