Original Article

Evaluation of Serum Beta 2 Microglobulin Levels in Oral Leukoplakia Patients

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ABSTRACT:
Background: Oral leukoplakia is defined as a predominantly white lesion or plaque of questionable behavior having excluded, clinically and histopathologically, any other definable white disease or disorderBeta-2 microglobulin is synthesized in all nucleated cells and forms the light chain subunit of the major histocompatibility complex class I antigen. Despite its potential role as a convenient and non-invasive prognostic indicator in malignant lymphomas, the influence of serum $\beta2$ microglobulin is currently underestimated, and therapeutic decision making is rarely affected by this marker. **Aim of the study:** To evaluate serum beta 2 microglobulin levels in oral leukoplakia patients. **Materials and methods:** The study was conducted in the Department of Oral medicine of the dental institution. The ethical clearance for study protocol was obtained from ethical committee of the institution. For the study, patients who were histopathologically diagnosed as oral leukoplakia wer included. Patients suffering from any allergic, inflammatory, or systemic disease were excluded from the study. A total of 30 patients with confirmed diagnosis of oral leukoplakia were included in the study. For the lab work, 5 ml of venous blood was collected from antecubital vein of all the participating subjects under aseptic conditions. **Results:** The level of serum beta-2 microglobulin level in patients with hyperkeratosis with mild dysplasia was at 1791.21, in Hyperkeratosis with moderate dysplaisa was at 2093.32, and in Hyperkeratosis with sever dysplasia was at 2269.74. The number of patients with hyperkeratosis with mild dysplaisa was 11, with hyperkeratosis with moderate dysplasia was 13 and with hyperkeratosis with severe dysplasia was 6. **Conclusion**: From the results of current study, this can be concluded that serum beta-2 microglobulin level can be used as a better indicator and can give an early indication of oral leukoplakia.
Key words: Oral leukoplakia, premalignancy, beta-2 microglobulin.

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INTRODUCTION:
Oral leukoplakia is defined as a predominantly white lesion or plaque of questionable behavior having excluded, clinically and histopathologically, any other definable white disease or disorder.[1] The etiology of OL is considered multifactorial, but smoking is appreciated to be a frequently involved factor. It is much more common among smokers than among non-smokers.[2] Alcohol is thought to be an independent risk factor but definitive data are still lacking. There are conflicting results of studies related to the possible role of human papillomavirus infection. As OL can mimic a large variety of lesions, in case a possible causal factor is suspected such as dental restoration, mechanical irritation. In the later case a subsequent evaluation in 4 weeks is needed.[3,4] Beta-2 microglobulin is synthesized in all nucleated cells and forms the light chain subunit of the major histocompatibility complex class I antigen. Despite its potential role as a convenient and non-invasive prognostic indicator in malignant lymphomas, the influence of serum $\beta2$ microglobulin is currently underestimated, and therapeutic decision making is rarely affected by this marker. Recent studies that included

relatively large numbers of patients with specific histologic subtypes showed that serum β2 microglobulin is a potent prognostic marker in OSMF.[5, 6] Hence, the present study was conductedto evaluate serum beta 2 microglobulin levels in oral leukoplakia patients.

MATERIALS AND METHODS:

The study was conducted in the Department of Oral medicine of the dental institution. The ethical clearance for study protocol was obtained from ethical committee of the institution. An informed written consent was obtained from the participating subjects. For the study, patients who were histopathologically diagnosed as oral leukoplakia wer included. Patients suffering from any allergic, inflammatory, or systemic disease were excluded from the study. A total of 30 patients with confirmed diagnosis of oral leukoplakia were included in the study. For the lab work, 5 ml of venous blood was collected from antecubital vein of all the participating subjects under aseptic conditions. The blood sample was labelled accurately and stored for transport to lab for the estimation of beta-microglobulin level.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.
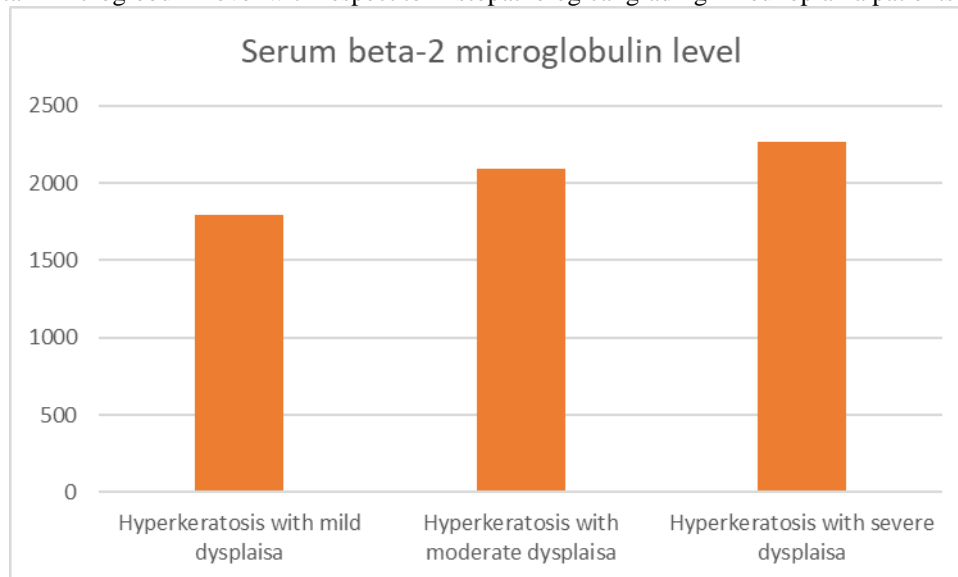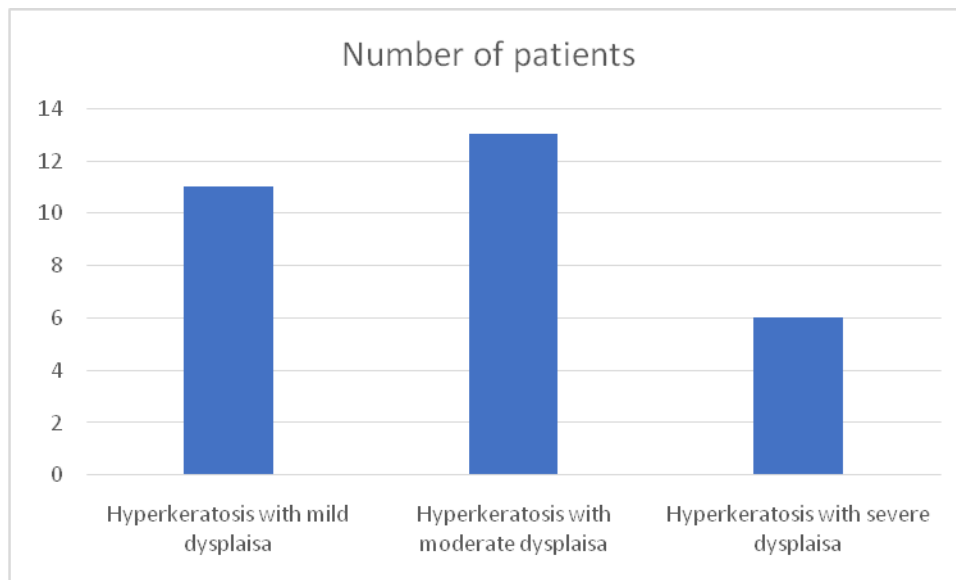
RESULTS:

Table 1 shows the comparative evaluation of serum beta-2 microglobulin level with respect to histopathological grading in leukoplakia patients. The level of serum beta-2 microglobulin level in patients with hyperkeratosis with mild dysplasia was at 1791.21, in Hyperkeratosis with moderate dysplaisa was at 2093.32, and in Hyperkeratosis with sever dysplasia was at 2269.74 [Fig 1]. The number of patients with hyperkeratosis with mild dysplaisa was 11, with hyperkeratosis with moderate dysplasia was 13 and with hyperkeratosis with severe dysplasia was 6 [Fig 2]. The results were compare and were found to be statistically significant.

Table 1: Comparative evaluation of serum beta-2 microglobulin level with respect to Histopathological grading in leukoplakia patients

Histopathological grading	Number of patients	Serum beta-2 microglobulin level	p-value
Hyperkeratosis with mild dysplaisa	11	1791.21	0.005
Hyperkeratosis with moderate dysplaisa	13	2093.32	
Hyperkeratosis with severe dysplaisa	6	2269.74	

Fig 1: Serum beta-2 microglobulin level with respect to Histopathological grading in leukoplakia patients

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Fig 2: Number of patients with respect to Histopathological grading in leukoplakia patients

DISCUSSION:

In the present study, we observed significant increase in the serum beta-2 microglobulin level with respect to increasing grading for dysplasia in oral leukoplakia patients. The results were compared with previous studies. Singh AP et al established the role of β2-m as a biochemical parameter for diagnosis and prognosis of oral carcinoma by estimation of serum β2-m levels in potentially malignant lesions, conditions, and oral squamous cell carcinoma. The study was carried out on 48 subjects (16 control, 8 oral submucous fibrosis, 8 oral leukoplakia, and 16 oral squamous cell carcinoma patients of different stages), conducted at department of Oral Medicine, Kothiwal Dental College, Moradabad, India. Under aseptic precautions, 5 ml venous blood was drawn and serum was separated. Estimation of β2-m level in serum was carried out by enzyme linked immunosorbent assay. The mean serum β2-m level in the control group was 1.173 ± 0.059, in potentially malignant lesions/conditions group was 1.688 ± 0.137 and in oral squamous cell carcinoma group was 2.835 ± 0.0313. This progressive increase in serum β2-m level was found to be highly significant. The study established that β2-m as a specific biological tumor marker for diagnostic and prognostic evaluation of oral squamous cell carcinoma. Saddiwal R et al evaluated the prognostic value of β2-m as a biochemical parameter for the diagnosis and prognosis of oral squamous cell carcinoma (SCC). The study included 60 patients (15 oral SCC, 15 leukoplakia, 15 individuals exposed to various carcinogens and without oral cancerous or precancerous lesions, 15 healthy individuals). The levels of β2-m were estimated using chemi-luminescent immunometric assay on Immulite fully automated machine. Statistical analysis of the data was done using Tuckey's test, ANOVA and independent sample t test. Results showed that β2-m was increased in individuals exposed to carcinogens without precancerous and cancerous lesion. They concluded that serum β2-m can be used as a better indicator and can give an early indication of malignant change and therefore malignancy can be detected at an early and treatable stage.[7, 8]

Ganavi BS et al evaluated the feasibility of serum lipid profile as an adjunct early marker for malignant transformation of leukoplakia to OSCC. The study group comprised of selected 30 individuals which included 10 each of histopathologically confirmed OSCC, leukoplakia and healthy controls. A written consent was taken from all of them, and a thorough case history was recorded and then venous blood was collected 12 hours post fasting and centrifuged. The serum cholesterol, triglycerides and HDL were estimated by enzymatic and colorimetric methods using commercially available kits--Roche/ Hitachi cobas systems. Chemistry assay QC procured from Bio-Rad was used as control. VLDL and LDL were derived from these values. Results were statistically analyzed using ANOVA and post hoc Tukey Test. Oral squamous cell carcinoma patients demonstrated significantly lower mean serum cholesterol level than the control group. The mean cholesterol level in leukoplakia patients was lower than that of control group but higher than that of the OSCC group with no statistical significance. They concluded that the convenience, universal availability, patient compatibility and simplicity being the merits of serum lipid profile make it a feasible adjunctive prognosticator in leukoplakic patients. Jiang Q et al investigated β2-microglobulin (β2-M) expression in normal oral mucosa and progressive oral squamous cell carcinoma (OSCC) and to assess the clinical significance of β2-microglobulin expression. The study included 10 cases of normal oral mucosa epithelium specimens, 55 cases of primary OSCC specimens, and 25 cases of OSCC metastasis specimens.

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Immunohistochemistry was used to determine β2-M expression, and its correlation with clinicopathological factors in progressive OSCC was evaluated. Immunohistochemistry showed that strong β2-M expression was significantly associated with tumor size, positive node status and advanced clinical stage in primary OSCC lesions. Compared to primary OSCC lesions, the frequency of β2-M expression was significantly increased in metastatic OSCC lesions. In addition, in vitro results from Western blotting showed increased β2-M expression in the two OSCC lines studied. Therefore, they speculated that the up-regulation of β2-M expression may contribute to the oncogenesis of human oral mucosa, tumor invasion and metastasis.[9, 10]

CONCLUSION:
From the results of current study, this can be concluded that serum beta-2 microglobulin level can be used as a better indicator and can give an early indication of oral leukoplakia.

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