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Original Research

Evaluation of serum beta-2 microglobulin in oral cancer patients

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ABSTRACT:
Background: Oral cancer is the sixth most common cancer worldwide and is highly prevalent in Indian population. One of tumor marker is serum β2-microglobulin (β2-m). Hence; the present study was undertaken for evaluating serum beta-2 microglobulin in oral cancer patients. **Materials & Methods:** A total of 30 patients with confirmed histopathologic diagnoses of oral squamous cell carcinoma (OSCC) and 30 healthy controls were enrolled. Complete demographic and clinical details of all the patients were obtained. Clinical examination of all the patients was carried out. Blood samples were obtained from all the patients and were sent to laboratory for assessment of serum beta-2 microglobulin levels. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. **Results:** Mean serum beta-2 microglobulin levels among the patients of the OSCC group and control group was 2.96 mg/L and 1.28 mg/L respectively. While comparing statistically, significant results were obtained. **Conclusion:** The estimation of serum β2-microglobulin may be useful as one of a battery of tests in the assessment of oral carcinoma patients.
Key words: Beta-2 microglobulin, Oral cancer

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INTRODUCTION

Oral cancer is the sixth most common cancer worldwide and is highly prevalent in Indian population. Tobacco chewing habit is postulated to have a close co-relation with high incidence of oral precancer, cancer and a precancer is considered to hold an increased risk of cancer transformation. Tumour markers are a major part of the secondary prevention (detection) efforts. Tumor markers are important for predicting the future behaviour of initiation, promotion, conversion, and progression in carcinogenesis process. Tumour markers are detected in higher than normal amounts in the serum. The alterations in the serum immunoglobulins, circulating immune complexes and complement factors have been reported earlier to show significant changes in oral cancer and precancerous conditions.[1-3]

One of tumor marker is serum β2-microglobulin (β2-m) and it was first described and isolated from the urine of patients with tubular proteinurias by Berggard and Bearn in 1968. β2-m is a low molecular weight, 11600 Dalton protein found on the surface of all cells except erythrocytes. It was also shown to occur in small quantities in normal human urine, plasma, and cerebrospinal fluid. This protein is the light or β-chain of the human leukocyte antigen (HLA). It exists in two main forms free and non-covalently linked to the HLA antigens, forming an invariant part of the HLA molecules. The serum β2-m is in the free form and it consists of a single polypeptide chain with one intrachain disulfide bridge and it does not contain carbohydrate.[4-6] Hence; the present study was undertaken for evaluating serum beta-2 microglobulin in oral cancer patients.

MATERIALS & METHODS

The present study was planned with the aim of evaluating serum beta-2 microglobulin in oral cancer

patients. A total of 30 patients with confirmed histopathologic diagnoses of oral squamous cell carcinoma (OSCC) and 30 healthy controls were enrolled. Complete demographic and clinical details of all the patients were obtained. Clinical examination of all the patients was carried out. Blood samples were obtained from all the patients and were sent to laboratory for assessment of serum beta-2 microglobulin levels. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Student t test was used for evaluation of level of significance.

RESULTS

A total of 30 OSCC patients and 30 healthy controls were enrolled. Mean age of the patients of the OSCC group and control group was 51.3 years and 48.5 years respectively. Majority of the patients of both the study groups were males. Mean serum beta-2 microglobulin levels among the patients of the OSCC group and control group was 2.96 mg/L and 1.28 mg/L respectively. While comparing statistically, significant results were obtained.

Table 1: Comparison of serum beta-2 microglobulin levels

Serum beta-2 microglobulin	OSCC group	Control group
Mean	2.96	1.28
SD	1.38	0.23
p- value	0.00 (Sig)	

DISCUSSION

Oral carcinoma is highly prevalent in Indian population and is primarily associated with various habits. A close co-relation between tobacco habit and oral carcinoma is well-established. Oral carcinoma constitutes 30-40% of all carcinoma in India. Tumor markers are substances, which quantitatively changes in serum, during the tumor development. Recently, biological tumor markers have been introduced for early diagnosis of carcinoma. These markers have a wide range of potential application, for screening, diagnosis, prognosis, and follow-up monitoring. β2-Microglobulin was also shown to occur in small quantities in normal human urine, plasma and cerebrospinal fluid. This protein is the light or β-chain of the human leukocyte antigen (HLA). It exists in two main forms free and non-covalently linked to the HLA antigens, forming an invariant part of the HLA molecules.[6- 10] Hence; the present study was undertaken for evaluating serum beta-2 microglobulin in oral cancer patients.

A total of 30 OSCC patients and 30 healthy controls were enrolled. Mean age of the patients of the OSCC group and control group was 51.3 years and 48.5 years respectively. Majority of the patients of both the study groups were males. Chen CH et al determined the possible correlation between β2M expression and various clinical characteristics, 256 samples from patients with OCSCC were evaluated by immunohistochemical staining. Strong β2M expression was significantly correlated with a relatively advanced tumour stage (P<0.001), positive nodal status (P<0.001), and TNM stage (P<0.001). The cumulative 5-year survival rate was significantly correlated with a relatively advanced tumour stage (P<0.001), positive nodal status (P<0.001), TNM stage (P<0.001), and strong expression of β2M (P<0.001). Thus, elevated β2M expression is an indicator of poor survival (P<0.001). In addition, we extended our analysis of β2M expression to the FaDu and SCC25 oral cancer cell lines. β2-Microglobulin expression was positively correlated with cell migration and invasion in β2M-overexpressing transfectants in Transwell chambers. The suppression of β2M expression using small interfering RNA (siRNA) was sufficient to decrease cell migration and invasion in vitro.[10]

In the present study, mean serum beta-2 microglobulin levels among the patients of the OSCC group and control group was 2.96 mg/L and 1.28 mg/L respectively. While comparing statistically, significant results were obtained. 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. Results showed that β2-m was increased in individuals exposed to carcinogens without precancerous and cancerous lesion. 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.[11] 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. 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 (P value < 0.001). Results of Receiver operating characteristic analysis showed β2-m as a 100% sensitive and specific biomarker for oral squamous cell carcinoma. Their

study established β2-m as a specific biological tumor marker for diagnostic and prognostic evaluation of oral squamous cell carcinoma.[12]

CONCLUSION

The estimation of serum β2-microglobulin may be useful as one of a battery of tests in the assessment of oral carcinoma patients.

REFERENCES

1. Shuster J., Gold P., Poulik M.D. β2-microglobulin levels in cancerous and other disease states. Clin. Chim. Acta. 1976;67:307–313.
2. Pita O., Frezzolini A., Cianetti A., Sanctis G., Fontana L., Bottari V. Squamous cell carcinoma related antigen (SCCr-Ag), sICAM-1 and beta 2-microglobulin are useful markers of disease activity in psoriasis. Acta. Derm. Venereol. 1999;79:132–135.
3. Silvia CR, Vasudevan DM, Prabhu KS. Alteration of serum beta 2-microglobulin in oral carcinoma. Indian J Clin Biochem. 2002;17(2):104-107.
4. Evrin P.E., Wibell L. Serum β2-microglobulin in various disorders. Clin. Chim. Acta. 1973;43:183–187.
5. Kithier K., Cejka J., Belamariac J., Al-Sarraf M., Peterson W.D., Vaitkevicius V.K., Poulik M.D. β2-microglobulin: Occurrence in fetal life and malignancy. Clin. Chim. Acta. 1974;52:293–299.
6. Miyata T., Jadoul M., Kurokawa K., Strihou C.V.Y. Beta-2 microglobulin in renal disease. J. Am. Soc. Nephrol. 1998;9:1723–1735.
7. Eley B.S., Hughes J., Potgieter S., Keraan M., Burgess J., Hussey G.D. Immunological manifestations of HIV-infected children. Ann. Trop. Paediatr. 1999;19:3–7
8. Scully C. Serum β2-microglobulin in oral malignancy and premalignancy. J Oral Pathol. 1981;10:354–357.
9. Wilma Delphine Silvia CR, Vasudevan DM, Sudhakar Prabhu K. Alteration of serum beta-2-microglobulin in oral carcinoma. Indian J Clin Biochem. 2002;17(2):104–107.
10. Chen CH, Su CY, Chien CY, et al. Overexpression of beta2-microglobulin is associated with poor survival in patients with oral cavity squamous cell carcinoma and contributes to oral cancer cell migration and invasion. Br J Cancer. 2008;99(9):1453-1461.
11. Saddiwal R, Hebbale M, Sane VD, Hiremutt D, Gupta R, Merchant Y. Estimation of Serum Beta 2-Microglobulin Levels in Individuals Exposed to Carcinogens: Clinical Study in Indian Population. J Maxillofac Oral Surg. 2017;16(1):53-57.
12. Singh AP, Kumar N, Raju MS, Singh NN, Nagendrareddy SG. Estimation of serum β2-microglobulin in potentially malignant disorders and squamous cell carcinoma of the oral cavity: A clinicopathological study. Dent Res J (Isfahan). 2014;11(1):109-113.