Research Journal of Pharmaceutical, Biological and Chemical Sciences

Estimation and Correlation of Salivary Sialic acid level between OSCC and PMD.

S Ezhilpallavi[1]*, M Kotteswaran[2], and R Muruganandham[3].

[1]Assistant Surgeon, Department of Dentistry, Government Medical College & Hospital, Virudhunagar, Tamilnadu, India.
[2]Assistant Professor, Department of Biochemistry, Government Medical College & Hospital, Virudhunagar, Tamilnadu, India.
[3]Assistant Professor, Department of Community Medicine, Government Medical College & Hospital, Thiruvallur, Tamilnadu, India.

ABSTRACT

Oral cancer is a major threat to public health. It has a high mortality rate and it is the sixth common cancer in humans in the world [1]. About 50-70% of cancer related deaths in India are due to oral cancers. India has the highest incidence of Oral Squamous Cell Carcinoma (OSCC) in the world. Oral cancer is usually preceded by oral precancerous lesions & conditions (now named as potentially malignant disorders (PMD)) such as oral leukoplakia, OSMF with a malignant transformation rate from 0.6 to 3.6%. The present clinical ways to deal with cancer diagnosis and treatment involves invasive & painful procedures Therefore, a noninvasive procedure using a tumor marker is essential for early diagnosis of oral cancer as well as to monitor its progression during treatment. Tumor markers are biochemical substances elaborated by tumor cells into the circulation. Once such substance is Sialic acid (N-Acetylneuraminic acid) level which was analyzed in the saliva and it is to be the first choice of screening and identification of potential biomarkers in the oral cancer [2]. So, this present study is to evaluate and correlate the levels of Salivary Sialic acid in patients with OSCC and oral premalignancy with those of healthy controls.
Keywords: PMD, OSCC, Sialic acid.

*Corresponding author

INTRODUCTION

Oral cancer is a major threat to public health. It is the sixth most common human cancer in the world, with a high mortality rate [1]. It is the fourth common site for cancer in males and fifth common site in females after cervix, breast, stomach and liver. About 50-70% of cancer related deaths in India are due to oral cancers. The data from WHO global oral health programme suggested that tobacco use & excessive alcohol consumption was estimated to account for about 90% of oral cancers [3]. In the oral cavity, squamous cell carcinoma is the most common with a high morbidity rate [4]. Oral cancer is usually preceded by oral precancerous lesions & conditions (now named as potentially malignant disorders (PMDs)) such as oral leukoplakia, OSMF with a malignant transformation rate from 0.6 to 3.6%. So, recognition & diagnosis of early superficial cancer of the oral cavity is the most difficult task. It is usually asymptomatic for a long time & by the time patient seeks advice it would have invaded deeply and hence prognosis become poor. The present clinical approach for a cancer diagnosis & management involves invasive & painful procedures. Therefore, a simple & noninvasive procedure using a tumor marker is needed for early diagnosis as well as to monitor the progress during treatment.

Tumor markers are biochemical substances elaborated by tumor cells into the circulation due to aberrant glycosylation that occur as an effect of carcinogenesis [5]. Once such substance is Sialic acid (N-Acetylneuraminic acid) which is a negatively charged nine carbon monosaccharide. It is commonly attached to the non-reducing residues of the carbohydrate chain of glycoconjugates by a glyosidic linkage. Sialic acid is found to be significant in determining the surface properties of cells & hence play a role in cellular invasiveness, adhesiveness & immunogenicity [6]. Saliva being a bio-fluid which is a filter of serum from vasculature that nourishes the Salivary glands. So, any change that occurs in the serum as a result of disease process will be reflected in saliva. The most important point for selecting saliva as a diagnostic tool is that it also contains the fallen cells in oral cavity which allow saliva to be the first choice of screening and identification of potential biomarkers in the oral cancer [2] and it could be the ideal tool for screening, diagnosis & management of oral cancers [7]. So, this present study is to evaluate and correlate the status of salivary Sialic aid in oral premalignancy & OSCC.

MATERIALS AND METHODS

Under Randomized prospective case control study design, Sixty subjects were selected and divided into three groups. Twenty subjects in each group of oral squamous cell carcinoma patients, oral potentially malignant disorders and healthy controls. Patients associated with other conditions such as Cardiovascular disorder, Renal disease, Co-existing tumors e.g. Brain tumors, Carcinoma of breast, lungs etc, infections, Diabetes mellitus and thyroid disorders are excluded. A saliva samples were collected from all the groups for the Salivary Sialic acid estimation and it is estimated by ELISA Method. All statistical analysis was performed using SPSS statistics version 20.0. ANOVA was applied and the results are expressed as mean $\pm$ SD, $p < 0.05$ – significant.

RESULTS

Table 1 Shows the mean salivary Sialic acid levels in 20 OSCC patients (148.30) 20 oral PMD patients (70.70) and in 20 healthy controls (24.25)

Table 2 Shows group wise comparison of the Salivary Sialic acid levels by Post Hoc test , the levels in Group I (OSCC) is greater than in group II (PMD) and group III (healthy controls) , the levels in group II (PMD) is lesser than in group I (OSCC) but greater than in group III (healthy controls) and the levels in group III (healthy controls) is lesser than in group I (OSCC) and group II (PMD). The p value obtained on group wise comparison of the study subjects was statistically significant with p value 0.000 which is less than 0.001 (i.e) significance at 1 level – highly significant. Therefore, we conclude that there is a significance difference among the OSCC patients, PMD patients and control group with regards to salivary Sialic acid levels.
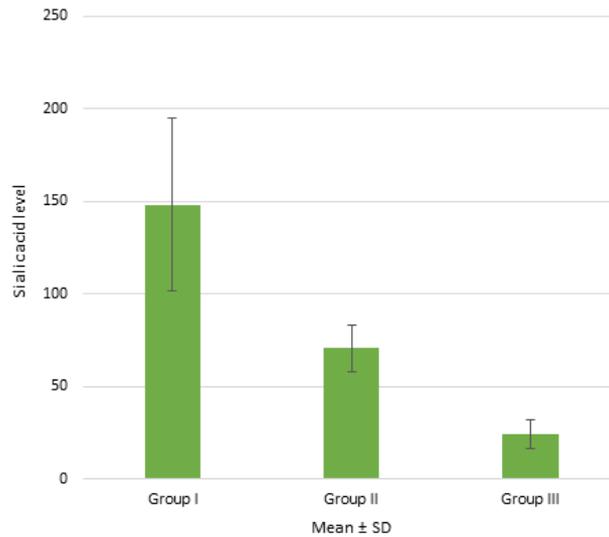
Figure 1: Sialic Acid Level In Each Group

Table 1: Sialic Acid Level In Each Groups

Sialic acid level			
GROUPS	N	Range	Mean ± (SD)
Group I	20	100-263	148.30 ± (46.483)
Group II	20	50-99	70.70 ± (12.541)
Group III	20	11-39	24.25 ± (7.725)

Table 2: Multiple Comparisons Of Sialic Acid Levels Between Groups

(I) Group	(J) Group	Mean Difference (I-J)	P value
Group I	Group II	77.600*	.000
	Group III	124.050*	.000
Group II	Group I	-77.600*	.000
	Group III	46.450*	.000
Group III	Group I	-124.050*	.000
	Group II	-46.450*	.000

DISCUSSION

The India subcontinent accounts for one-third of the world burden of this malignancy. Several studies had indicated the strong relation between tobacco and oral cancer. Most of the oral cancers are preceded by potentially malignant disorders which generally have an increased risk of progressing to malignancy, but the risk varies depending upon a number of patient and lesion related factors. Therefore, it is a difficult task to predict the risk of progression in any individual patient, and the clinician must make a judgment only based on assessment of each case. The most commonly encountered OPMDs are leukoplakia, oral sub-mucous fibrosis, and Erythroplakia [8]. In most cases oral cancer is diagnosed only when it becomes symptomatic, but by this stage most patients usually develop the advanced stages of the disease with regional metastasis and have consequently diminished prognosis. So, early diagnosis of oral cancer is considered as the most important step than to treat the disease because it not only reduces the chance of spread of disease, but also rules out many invasive treatment strategies and increases the chances of normal survival

Many diagnostic aids are available for early diagnosis of oral cancer, but the role of biological markers is contested over others by various studies. Biological markers are used to diagnose cancer and to predict the therapeutic response and prognosis.

One such biological marker is Sialic acid and in the past few decades the role of Sialic acid as a tumor marker have been evaluated and advocated by various studies conducted in different parts of the world

In the present study, the mean salivary Sialic acid levels were found to be elevated in OSCC as compared to premalignant followed by the control group. The levels also showed statistically significant difference (P < 0.05) between the three groups.

CONCLUSIONS

Salivary Sialic acid levels were found to be elevated in OSCC followed by oral precancer and healthy subjects. The results of the present study infer that salivary Sialic acid may be used as a tumor marker for early diagnosis of oral cancer as well as to predict its prognosis since the procedure is simple and non-invasive.

Very few studies have been done on salivary Sialic acid estimation and its use as a diagnostic tool would go a long way in early diagnosis of oral cancer. However, a longitudinal study with a larger sample size is needed to evaluate the authenticity of these parameters as specific tumor markers.

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