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Salivary IgA and Dental Caries in Type II Diabetics in Indian Adult Population

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Abstract

Aim: To evaluate relationship between Salivary IgA and Dental caries in Type II Diabetics in Indian Adult Population.

Method: Study was conducted on 30 patients of age group ranging from 25-60years including type II diabetic and non diabetic patients. Patients were divided into 3 groups of 10 subjects each according to diabetic and DMFT scores as G-1 (control, non diabetic) DMFT- 0, G-2 (non diabetic) DMFT 4 - 8 and G-3 (diabetic) DMFT 4 - 8. Unstimulated saliva samples were collected from each subject for estimation of IgA using the Turbidometric method. Data obtained were statistically analysed.

Results: Correlation of Salivary IgA and DMFT showed steady decrease in values of Salivary-IgA from Group I – III. The variation in Salivary- IgA level was Very Highly Significant [VHS] when diabetic DMFT 4-8 was compared with control and non diabetic DMFT 4-8; Highly significant [HS] between control and non diabetic DMFT 4-8.

Conclusion: Salivary-IgA values showed an inverse relationship to the DMFT values with levels of Salivary-IgA decreasing with an increase in DMFT Values. Salivary-IgA level in type II Diabetic patients with DMFT-4-8 had significantly lower values than non diabetic patients of similar DMFT scores.

Keywords: Dental caries; DMFT; Salivary-IgA; Diabetes

Introduction

There are many factors responsible for dental caries such as poor oral hygiene, concentration of bacteria in oral cavity with acidophilic activity, hereditary, cariogenic diet and reduced level of fluoride in drinking water [1].

Since the infectious process of caries has been well established in humans one may justify that some kind of host immunity regulates caries activity. Salivary IgA (S-IgA) is the first line of defence of the host against pathogens which invade oral mucosal surfaces. The Salivary-IgA antibodies improve the oral immunity by preventing adherence of microbes, neutralizing enzymes, toxins and viruses; or by acting in synergy with other factors such as lysozyme and lactoferrin [4-6].

An increase in the rate of dental caries has been reported in patients with diabetes and may relate to salivary dysfunction [12]. Salivary-IgA this study was done to evaluate the relationship between Salivary-IgA and dental caries in type II Diabetics in Indian adult population.

Materials and Methods

Patients aged between 25-60 years of age with type II diabetes and non-diabetes visiting the Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences, Mangalore, Karnataka were screened for DMFT. Subjects including caries-free, caries-active and Type II diabetic subjects showing positive results for Fasting Blood Sugar (FBS) and Haemoglobin Assay

(Hb A_{1C}) were included in the study. Patients with systemic conditions other than diabetes, such as those with medication induced Xerostomia, patients on radiotherapy and completely edentulous patients were excluded from the study. Informed consent from all the patient's and institutional ethical clearance was obtained for this study.

The DMFT index (WHO 2013) of the consenting patients was recorded [13-15] and based on their DMFT scores and diabetic status, a total of 30 patients were selected and divided into three groups of 10 subjects each as follows: Group I [Control group] - with DMFT Score - 0, Group II [non-diabetic] - with DMFT Score 4 -8, Group III [diabetic] - with DMFT Score 4-8.

Unstimulated saliva samples were collected according to Dawe's method [16,17]. Prior to the collection of saliva samples, the subjects were asked to abstain from smoking, brushing of teeth, use of mouth wash and eat or drink for 1 hour. During sample collection, the subject was seated in a normal chair instead of the dental chair to maintain a stress-free environment. The un-stimulated (resting) saliva samples were collected by asking the subjects to pool the saliva on the floor of the mouth and then made to expectorate it into a collection cup. The Salivary-IgA levels in the salivary samples were estimated using a semi-auto analyzer by the immune-turbidometric method [AGAPPE Diagnostics Switzerland IgA kit 11815001] (Figure 1).

The data collected were statistically analyzed with ANOVA and Tukey's HSD test.

Figure 1: Salivary IgA Kit

Results

The Salivary IgA levels were found to be the highest in Group I [control - DMFT score–0] 309.346 mg/dl followed by Group II [non-diabetic- DMFT score 4-8] 254.26 mg/dl and Group III [Diabetic - DMFT score 4-8] 160.476 mg/dl as shown in Table 1.

Inter group comparison with Post -hoc analysis showed the variation in Salivary-IgA level (Table 2).

Statistically significant results P<0.001 (P<0.005) were seen between:

a) GI (control, nondiabetic- DMFT 0) and GIII (diabetic - DMFT 4-8)

b) GII (non diabetic- DMFT 4-8) and GIII (diabetic DMFT 4-8) P<0.001(P<0,005).

c) GI (control, non diabetic DMFT-0) and GII (nondiabetic DMFT 4-8) P<0.001(P<0.005).

	Mean	Standard. Deviation
G1	309.346	41.210
G 2	254.26	27.821
G 3	160.476	31.810

Table 1: Comparison of Salivary IgA & DMFT

G Vs G		I - J Value (Mean difference)	P- Value	Statistical Significance
G I	G II	55.086	0.003	HS
G1	G III	148.870	<0.001	VHS
G11	G 111	93.784	<0.001	VHS
Standard Error =15.24086				

Table 2: Inter-Group Comparison of Salivary IgA Levels

Discussion

Saliva contains many components present in serum that can be used in diagnosing various systemic diseases [18,19]. The Salivary-IgA is a protective agent against infections occurring in the oral cavity and shows variations in different conditions and diseases. In the present study a positive correlation was seen in diabetic patients between salivary-IgA concentration and caries index which is in agreement with Tenuvuo et al. [20-22]. The Salivary-IgA levels in Type II Diabetic patients with DMFT – 4 - 8 was less (160.476 mg/dl) compared to non-diabetic patients with same DMFT (254.26 mg/dl); whereas it was lesser in comparison to control group DMFT- 0 (309.346 mg/dl) [Table 1]. As the DMFT value increases the Salivary-IgA levels show a steady decrease as seen in group I and II, while it is further decreased in group III. In a study by Bhuyan et al the Salivary-IgA levels progressively decreased from normal individuals to controlled diabetics and further in uncontrolled diabetics [23]. This is due to decrease in local immune response of diabetic patients in the form of low Salivary-IgA levels which makes them more susceptible to oral infections [23]. In a study done by Mithra et al it has been shown that the infectious nature of dental caries can be due to some form of host immunity which can regulate caries activity. If immunity could regulate the caries then Salivary-IgA might give a clear correlation. It has been suggested that S-IgA antibodies generated by the mucosal immune system play an important role in the immune response against dental caries [1] which is in agreement with the present study. Semiautoanalyser has been used for estimating salivary IgA Samples as we have used AGAPPE kit for the estimation of salivary IgA.

However, in contradiction Charles et al. and Farid et al. found Salivary-IgA levels of Type II diabetic patients to be significantly higher than those in the control group, which indicates that elevation of IgA could be due to infections as it was seen in patients with infections included in their study [24,25].

Conclusion

From the results of the study we conclude that:

- Salivary-IgA values showed an inverse relationship to the DMFT values with levels of Salivary-IgA decreasing with an increase in the DMFT values.
- Salivary-IgA level in type II Diabetic patients with DMFT-4-8 has significantly lower value than non diabetic patients of same DMFT.

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