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Original Research

Determine the correlation between dental caries and salivary uric acid

[1]Aashima Gupta, [2]Ruhi Mahajan

[1]Reader, Himachal Dental College, Sundernagar, Himachal Pradesh, India;
[2]Assistant Professor, Deptt of Biochemistry, ASCOMS, Jammu, Jammu and Kashmir, India

ABSTRACT:
Aim: To determine the correlation between dental caries and salivary uric acid. **Methods:** The current investigation was carried out and involved the measurement of salivary uric acid levels in individuals with dental caries. The current research comprised 100 participants with clinical indications of dental caries. As healthy controls, another group of 100 people were included who had no clinical evidence of dental caries and no signs or symptoms of dental caries. **Results:** The majority of the participants in Categories A and B were between the ages of 35 - 45. There were 55 men in Category A and 61 men in Category B. The mean salivary uric acid levels in Category A and Category B participants were 2.36 and 2.56 mg/dl, respectively. **Conclusion:** Based on the findings, the authors suggest that uric acid levels may be altered in individuals with dental caries, indicating the importance of the antioxidant system in the disease's aetiology.
Keywords: dental caries, salivary uric acid

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Corresponding author: Aashima Gupta, Reader, Himachal Dental College, Sundernagar, Himachal Pradesh, India

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INTRODUCTION

Saliva is a complex biological fluid that contains various components that work together to prevent tooth cavities by mechanical cleaning, antibacterial activity, remineralization, and oral pH regulation through its buffering capacity. [1] Saliva not only physically eliminates food substrates and plaque acids from the mouth, but it also plays a vital function in balancing the pH of saliva and plaque. Fast-flowing saliva is alkaline, with a pH of 7.5-8.0, and is critical in increasing the pH of dental plaque that has been decreased by sugar and carbs. [2] Salivary buffers play a vital role in maintaining physiologic hydrogen ion concentrations at the mucosal epithelial cell surface and the tooth surface. The bicarbonate–carbonic acid system is the most significant salivary buffer. [3]

To maintain its saturation, saliva contains a variety of organic and inorganic chemicals such as bicarbonate, calcium, phosphate ions, and so on. As a result of this saturation, a thermodynamic driving force is established that is beneficial for remineralization and unfavourable for demineralization. Low salivary buffering ability, as well as low calcium and phosphate levels, are strongly linked to increased caries. The ionic concentration of calcium and phosphate in saliva, which is affected by alkaline phosphatase levels, is required to maintain the balance between demineralization and remineralization. A high concentration of calcium and phosphate on the surface of the tooth induces post-eruptive maturation of enamel, increased surface hardness, and resistance to demineralization. Variations in alkaline phosphatase levels cause phosphate levels to fluctuate, resulting in the development and progression of dental caries. Alkaline phosphatase is a non-specific enzyme involved in the calcification process that responds between pH 9 and 10. [4]

Salivary flow has a caries-preventive impact via affecting substrate clearance rate: the greater the flow rate, the quicker the clearance rate.[5] Salivary viscosity, hydration level, and salivary flow rate all have an inverse relationship. Viscid saliva is less efficient in clearing the mouth. Dental caries may be reduced if high caries risk factors and persons at risk are recognised early enough to undergo preventive and interceptive measures.

METHODS AND MATERIALS

The current investigation was carried out and involved the measurement of salivary uric acid levels

in individuals with dental caries. The current research comprised 100 participants with clinical indications of dental caries. As healthy controls, another group of 100 people were included who had no clinical evidence of dental caries and no signs or symptoms of dental caries. All patients' demographic and clinical information was acquired in detail. Salivary samples were collected from all individuals and forwarded to a laboratory for analysis of salivary uric acid levels.

RESULTS

The current research comprised 100 dental caries patients and 100 healthy controls. The mean age of Category A and Category B patients was 46.38 and 45.55 years, respectively. The majority of the participants in Categories A and B were between the ages of 35 and 45. There were 55 men in Category A and 61 men in Category B. The mean salivary uric acid levels in Category A and Category B participants were 2.36 and 2.56 mg/dl, respectively. When comparing the mean salivary uric acid levels of the study and control groups, non-significant findings were observed.

Table 1: Sex distribution of the category A and category B

Sex	Category A	%	Category B	%
Male	55	55	61	61
Female	45	45	39	39

Table 2: Age distribution of the category A and category B

Age in years	Category A	%	Category B	%
Below 25	12	12	8	8
25-35	15	15	20	20
35-45	45	45	50	50
45-55	22	22	16	16
Above 55	6	6	6	6

Table 3: Salivary uric acid level of the category a and category B

	Mean ± Sd	
	Category A	Category B
Salivary uric acid level mg/dl	2.36±0.33	2.56±0.22

DISCUSSION

Dental caries have a complex aetiology and pathophysiology. It will be feasible to prevent and minimise the risk of caries in permanent dentition by identifying the function of numerous factors in the onset and advancement of caries in primary dentition. The body's antioxidant systems are a collection of substances that work to minimise oxidative stress and the effects of free radicals on the human body. Saliva, via salivary antioxidants, has been proposed as a first line of defence against oxidative stress. Salivary antioxidants are a class of enzymes that includes salivary peroxidase, salivary uric acid, and a few other enzymes. The total antioxidant capacity (TAC) of saliva refers to the combined ability of these enzymes to resist oxidative damage. [6-8]

The current research comprised 100 dental caries patients and 100 healthy controls. The mean age of Category A and Category B patients was 46.38 and 45.55 years, respectively. The majority of the participants in Categories A and B were between the ages of 35 and 45. Kumar SV et colleagues used the decayed, missing, and filled teeth (DMFT) index to conduct an oral examination to evaluate dental caries experience. The "ammonium molybdate technique" was used to determine the salivary total antioxidant capacity (TAC). Pearson's correlation and one-way ANOVA with the Bonferroni multiple comparison test were used to evaluate the data. The threshold of significance was set at 0.05 P value. TAC of saliva rose inversely with increasing DMFT scores. When saliva TAC was associated with DMFT scores, the correlation was 0.981 (P 0.0005). TAC of saliva was observed to increase with increasing dental caries experience. TAC of saliva may be a predictor of dental caries activity in youngsters. [8]

There were 55 men in Category A and 61 men in Category B. The mean salivary uric acid levels in Category A and Category B participants were 2.36 and 2.56 mg/dl, respectively. When comparing the mean salivary uric acid levels of the study and control groups, non-significant findings were observed. Muchandi S et al compared the salivary total antioxidant capacity (TAC) and salivary pH of children with and without early childhood caries. Fifty youngsters aged three to five years were screened and put into two research groups. Group I (n=25) had severe early childhood caries (S-ECC) whereas Group II (n=25) did not. During the investigation, patients' unstimulated entire saliva was collected using the draining technique. The pH of saliva samples was determined using pH indicator paper strips. The TAC was performed using an antioxidant test using a spectrophotometer at 532 nm. The means of salivary pH and TAC were analysed using an unpaired student 't' test, and the association was evaluated using Pearson's correlation coefficient analysis. Group II had a higher mean salivary pH

(7.46 0.37). Group I had a higher mean TAC (1.82 0.19). TAC and salivary pH had a statistically significant negative connection in S-ECC patients. The research indicated that salivary TAC elevations in S-ECC patients had a strong indirect association with salivary pH. [9] Akgul N et al explore the effects of dental composite filling materials on salivary nitric oxide (NO) and uric acid (UA) levels in healthy individuals. The research included 52 participants (32 females and 20 males). Healthy participants were given Filtek Z250 composite filler material (3M ESPE, St Paul, MN, USA). Saliva samples were obtained before to restoration (baseline), as well as one hour, one day, seven days, and thirty days thereafter. NO concentrations were determined using the Griess reaction technique, while UA values were determined using an enzymatic approach. After 7 days, NO levels rose statistically significantly (P 0.05). Furthermore, decreased UA levels were found when compared to baseline values, however the difference was not statistically significant (P>0.05). There was no connection (P > 0.05) between NO and UA levels in saliva. The antioxidant mechanism in saliva was triggered by composite resins. [10]

CONCLUSION

Based on the findings, the authors suggest that uric acid levels may be altered in individuals with dental caries, indicating the importance of the antioxidant system in the disease's aetiology.

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