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Original Research

Serum uric acid levels in patients with oral cancer, leukoplakia and submucous fibrosis

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ABSTRACT:
Background: To assess the serum uric acid levels in subjects with oral cancer, leukoplakia and submucous fibrosis. **Materials & Methods:** A total of 40 subjects were included. They were divided as 10 in each oral cancer, oral leukoplakia, submucous fibrosis and 10 as a control group. The p- value less than 0.05 was considered significant. **Results:** A total of 40 subjects were enrolled. Average serum uric acid levels were 4.87, 3.77, 5.66, and 5.10 mg/dL for individuals with OSCC, OL, OSMF, and the control group, respectively. **Conclusion:** The levels of serum uric acid were decreased in individuals with OL and OSCC, while they showed an increase in those with OSMF compared to the healthy control group.
Keywords: Oral cancer, uric acid, saliva.

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INTRODUCTION

Human saliva is known to be composed of 99% water along with inorganic salts that comprised sodium, potassium, calcium, phosphate, and bicarbonate, with some organic compounds that include uric acid, lactate, hormones, polypeptides, and proteins such as enzymes, mucins, and immunoglobulins.[1] Some of the other constituents of saliva that might be important as a biomarker are neopterin, nitrites, nitrates, and glutathione, which can be isolated from saliva. Studies have been conducted to determine the amount of immunoglobulin A (IgA) in the saliva of patients diagnosed with human immunodeficiency virus (HIV), and these studies have shown that anti-HIV IgA antibody isolated from the saliva may prove to be an important tool for the prognosis of patients with HIV by determining the chances of disease progression. [2] Oral squamous cell carcinoma (OSCC) is an aggressive malignant tumour characterized by a relatively low rate of prognosis. [3] OSCC may arise from accumulated process of genetic, epigenetic and metabolic changes resulting mostly from exposure to extrinsic sources (carcinogens). It includes the initial presence of a precursor or precancerous lesion, with the latter being a well-established form that is called an oral potentially malignant disorder (OPMD).[4,5] Oral leukoplakia (OL) and oral submucous fibrosis (OSMF) are the most common OPMDs, with reported malignant transformation rates ranging from 0.13% to 34% and from 1.9% to 9.13%, respectively.[6] Lifestyle factors, including tobacco, alcohol and areca nut/betel quid chewing, are the most common factors contributing to OPMD and OSCC development. To a lesser extent, the sexually acquired human papilloma virus is also a contributing factor.[3,7]Moreover, specific medical conditions can contribute to the OPMD prevalence. [8] Oral potentially malignant disorder (OPMD) incidence rates have ranged in the Indian subcontinent from 0.6 per 1,000 people to 30.2 per 1,000 people. OPMD occurrence has been estimated to range from 0.2% to 11.3%.[9] Leukoplakia, erythroplakia, oral lichen planus (OLP), oral submucous fibrosis (OSMF), and palatal changes are all OPMDs that may occur in ex-smokers who have quit smoking.[10] People in South and Southeast Asia, especially the Indian subcontinent, are

disproportionately affected by oral submucous fibrosis, a chronic, insidious disease. Over 2.5 million people in India are thought to be ill as a result of this.[11] OSMF is on the rise in India, and many believe that the country's love of areca nuts is to blame. OSMF occurs in around 0.5% of the population and has a progression to malignancy rate of 7.6%. [12] Hence, this study was done to assess the serum uric acid levels in subjects with oral cancer, leukoplakia and submucous fibrosis.

MATERIALS & METHODS

A total of 40 subjects were included. They were divided as 10 in each oral cancer, oral leukoplakia, submucous fibrosis and 10 as a control group. Complete clinical history was taken. Laboratory diagnosis was done. Serum uric acid level was assessed using the uricase method from a blood sample without hemolysis.Student t test was done. The result was analysed using SPSS software. The p-value less than 0.05 was considered significant.

RESULTS

A total of 40 subjects were enrolled. Average serum uric acid levels were 4.87, 3.77, 5.66, and 5.10 mg/dL for individuals with OSCC, OL, OSMF, and the control group, respectively. The mean serum uric acid level showed a statistically significant connection with OSCC only when contrasted with the control group (P=0.006).

Table 1: mean uric acid levels

Groups	Control	Oral leukoplakia	OSMF	OSCC
Number of patients	10	10	10	10
Serum uric acid (mg/dL)	5.10	3.77	5.66	4.87
P- value		0.5		0.006

statistically significant (P<0.05)

DISCUSSION

Squamous cell carcinoma (SCC) of the oral cavity is the most common kind of cancer in the head and neck region. Of all oral malignancies, oral squamous cell carcinoma (OSCC) accounts for around 92%-95%.[13] Males are affected at a rate two to three times greater than females because of their higher rates of cigarette and alcohol usage. Most oral squamous cell carcinomas are thought to originate in premalignant states.[14] Significant biochemical changes in OSMF include elevated serum copper and reduced iron. Oral cancer and leukoplakia patients often have higher serum copper levels than the general population. Patients with oral cancer, OSMF, and OLP had significantly reduced serum zinc levels. Patients with oral cancer have lower levels of iron and selenium in their bodies than healthy individuals do. Individuals with OSCC, OLP, and OSMF have been shown to have significantly higher blood lactate dehydrogenase activity. Alkaline phosphatase levels in OSCC are rising. [15] Hence, this study was done to assess the serum uric acid levels in subjects with oral cancer, leukoplakia and submucous fibrosis.In the present study, average serum uric acid levels were 4.87, 3.77, 5.66, and 5.10 mg/dL for individuals with OSCC, OL, OSMF, and the control group, respectively. A study by Yadav KD et al, fifty-two patients with oral potentially malignant disorders (OPMD) (25 OL and 27 OSMF cases) and 33 OSCC patients with complete clinical and histopathological characteristics were included. A healthy control group was also investigated. The serum uric acid concentration was assessed using the uricase method from a blood sample without hemolysis.The level means of serum uric acid in the OL, OSMF and OSCC patients were 3.86±1.31, 5.65±0.85 and 4.99±1.34 mg/dL, respectively, compared to 5.16±0.97 mg/dL in the healthy controls.The serum uric acid levels were reduced in the OL and OSCC patients but they were increased in the OSMF patients when compared to the healthy controls. No significant differences were seen in the clinical and histopathological features of the OL and OSMF patients. Future studies with larger sample sizes may improve the understanding of the contributory role of uric acid in the risk stratification of OPMDs. Although measuring the serum uric acid level involves a simple and economical assay, the data from this cross-sectional cohort does not support the clinical utility of evaluating the uric acid levels in OPMD and OSCC patients.[16]

In the present study, the mean serum uric acid level showed a statistically significant connection with OSCC only when contrasted with the control group (P=0.006). Another study by Lawal AO et al, thirty one oral cancer patients and thirty normal patients had serum uric acid measured using spectophotometer. The mean serum uric acid level in oral cancer patients was 5.18 mg/dl (SD±1.96) while the mean was 7.09 mg/dl (SD±1.84) for the control group and this difference was statistically significant (p=0.000, t= - 3.914, C.I. = - 2.885 to - 0.933). The risk of oral cancer was 3.98 times more in patients who had low serum uric acid. Serum uric acid was lower in oral cancer patients compared with healthy volunteers and low serum uric acid was associated with increased risk of oral cancer development. However, further prospective cohort studies are suggested to better understand the role of serum uric acid in aetiology of oral cancer.[17] Dharmana L et al, eighty patients over the age of 18 with a clinical diagnosis of oral potentially malignant disorder (OPMD) or oral cancer and verified histopathology were included in the research. Comparing OPMD and oral cancer patients to healthy controls, serum urea levels were found to

be greater, uric acid levels to be lower, and creatine kinase levels to be higher.Prognostic markers for OPMDs and oral cancer may include urea, uric acid, and creatine kinase. However, this may be accomplished by large-scale prospective research.[18]One of the cancers with exponentially high mortality is oral squamous cell carcinoma (OSCC). [19] Free radicals that are found in the saliva are responsible for oxidative stress that plays a vital role in the pathophysiology of oral squamous cell carcinoma.As mentioned before, uric acid is responsible for scavenging disease-causing free radicals; hence, a decrease in salivary uric acid might be linked to oral malignancy. In a study conducted by Salian et al., saliva were collected from a total of 50 subjects, comprising 25 subjects with oral squamous cell carcinoma and 25 healthy individuals. A mean uric acid level of 120.7 μmol/L was observed in the patients with oral squamous cell carcinoma, which was reduced significantly when compared with the control group who had a mean uric acid level of 320.0 μmol/L. [20]Oral lichen planus (OLP) is one of the important diseases with chronic inflammatory changes. The etiology of this condition remains unknown; however, it has a significant impact on patients' quality of life. Malignant transformation of oral lichen planus in the form of oral squamous cell carcinoma remains one of the most dangerous complications arising from oral lichen planus. In a study conducted by Darczuk et al., it was concluded that the levels of salivary antioxidants such as uric acid were reduced significantly in patients with oral lichen planus when compared with the control group.[21] Both Ara et al. [22] and Burgaz et al. [23] discovered that oral cancer disproportionately affected men. Oral cancer risk factors include tobacco use (smoking, chewing tobacco, and drinking), which may operate alone or together to increase that risk. In individuals who reverse smoke, however, the gender ratio is flipped, with more women than men engaging in this behavior. Ramesh et al. [24] conducted a study with female predominance in reverse smokers and have suggested various factors for an increase in female predilection, including the desire to keep their smoking habits hidden from their husbands, the increased likelihood of smoking chutta due to strong winds or splashing of water during household work, the desire to prevent hot ashes from falling on children, clothes, etc., and the desire to treat tooth pain in a culturally accepted way.

CONCLUSION

The levels of serum uric acid were decreased in individuals with OL and OSCC, while they showed an increase in those with OSMF compared to the healthy control group. There were no noteworthy distinctions observed in the clinical and histopathological characteristics of the OL and OSMF subjects.

REFERENCES

1. Chi AC, Day TA, Neville BW. Oral cavity and oropharyngeal squamous cell carcinoma--an update. CA Cancer J Clin 2015;65:401-21.
2. Farah CS, Shearston K, Nguyen AP, et al. Oral Carcinogenesis and Malignant Transformation. Premalignant Conditions of the Oral Cavity. Singapore: Springer Singapore, 2019:27-66.
3. Warnakulasuriya S, Johnson NW, van der Waal I. Nomenclature and classification of potentially malignant disorders of the oral mucosa. J Oral Pathol Med 2007;36:575-80.
4. Speight PM, Khurram SA, Kujan O. Oral potentially malignant disorders: risk of progression to malignancy. Oral Surg Oral Med Oral Pathol Oral Radiol2018;125:612-27.
5. Porter S, Gueiros LA, Leao JC, et al. Risk factors and etiopathogenesis of potentially premalignant oral epithelial lesions. Oral Surg Oral Med Oral Pathol Oral Radiol2018;125:603-11.
6. Frydrych AM, Kujan O, Farah CS. Chronic disease comorbidity in patients with oral leukoplakia. Oral Cancer 2019;3:17-26.
7. Potentially malignant disorders of the oral cavity: current practice and future directions in the clinic and laboratory. Dionne KR, Warnakulasuriya S, Zain RB, Cheong SC. Int J Cancer. 2015;136:503–515.
8. Oral premalignant lesions: from a clinical perspective. Amagasa T, Yamashiro M, Uzawa N. Int J Clin Oncol. 2011;16:5–14.
9. The clinicohistopathologic study of oral submucous fibrosis: a new staging system with treatment strategies. Jani YV, Dudhia BB. J Indian Acad Oral Med Radiol. 2016;28:111–118.
10. Serum proteins, transaminases and blood urea in patients with oral submucous fibrosis- a preliminary study. Naik ZA, Mamta GP, Balaji Rao B. Int J Adv Res Oral Sci. 2012;1:1–5
11. Saliva--a diagnostic window to the body, both in health and in disease. Greabu M, Battino M, Mohora M, et al. https://pubmed.ncbi.nlm.nih.gov/20108531/ J Med Life. 2009;2:124–132.
12. Saliva: a potential media for disease diagnostics and monitoring. Liu J, Duan Y. https://doi.org/10.1016/j.oraloncology.2012.01.021. Oral Oncol. 2012;48:569–577.
13. Potentially malignant disorders of oral cavity. George A, Sreenivasan BS, Sunil S, Varghese SS, Thomas J, Gopakumar D, Mani V. OMPJ. 2011;2:95–100.
14. Oral potentially malignant disorders: an overview of more than 20 entities. Mortazavi H, Baharvand M, Mehdipour M. https://pubmed.ncbi.nlm.nih.gov/25024833/ J Dent Res Dent Clin Dent Prospects. 2014;8:6–14.
15. Comparative study on lactate dehydrogenase, alkaline phosphatase and immunoglobulins in serum and saliva of acute leukemia and oral squamous cell carcinoma patients. Abdullah BH, Alaaraji SB, Merza KS. https://www.iasj.net/iasj/download/ca4ce9fcc25303e7 Iraqi J Sci. 2010;51:262–270.
16. Yadav KD, Patil BA, Raheel SA, Abuderman A, Patil S, Gaballah K, Kujan O. Serum uric acid levels in patients with oral cancer, leukoplakia and submucous fibrosis: a cross-sectional study. Transl Cancer Res. 2020 Apr;9(4):3084-3091.

17. Lawal AO, Kolude B, Adeyemi BF. Serum uric Acid levels in oral cancer patients seen at tertiary institution in Nigeria. Ann Ib Postgrad Med. 2012 Jun;10(1):9-12.
18. Dharmana L, Pottam A, Kollabathula SR, Kumar PS, Birra V, Dabbiru RC. Comparative Evaluation of Serum Urea, Uric Acid, and Creatine Kinase Levels in Oral Cancer and Potentially Malignant Disorders of the Oral Cavity: A Clinico-Biochemical Study. Cureus. 2023 May 17;15(5):e39123.
19. Head and neck squamous cell carcinoma. Johnson DE, Burtness B, Leemans CR, Lui VW, Bauman JE, Grandis JR. Nat Rev Dis Primers. 2020;6:92.
20. Estimation of salivary nitric oxide and uric acid levels in oral squamous cell carcinoma and healthy controls. Salian V, Demeri F, Kumari S. Clin Cancer Investig J. 2015;4:516–519.
21. The relationship between the concentration of salivary tyrosine and antioxidants in patients with oral lichen planus. Darczuk D, Krzyściak W, Bystrowska B, Kęsek B, Kościelniak D, Chomyszyn-Gajewska M, Kaczmarzyk T. Oxid Med Cell Longev. 2019;2019:5801570.
22. Evaluation of serum uric acid levels in patients with oral squamous cell carcinoma. Ara SA, Ashraf S, Patil BM. Indian J Dent Res. 2016;27:178–183.
23. Serum carotenoids and uric acid levels in relation to cancer. Burgaz S, Torun M, Yardim S, Sargin H, Orman MN, Ozdamar NY. J Clin Pharm Ther. 1996;21:331–336.
24. Palatal changes in reverse and conventional smokers - a clinical comparative study in South India. Ramesh T, Reddy RS, Kiran CHS, Lavanya R, Kumar BN. Indian J Dent. 2014;5:34–38.