Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr ICV 2018= 82.06

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Assessment of oral lycopene level in patients with oral leukoplakia

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ABSTRACT:

Background: Oral leukoplakia is a diagnosis given to a white patch that cannot be categorised. The present study was conducted to assess lycopene level in patients with oral leukoplakia. **Materials & Methods:** 45 patients of oral leukoplakia of both genders were divided into 3 groups. Group I had non- smokers, group II had smokers without leukoplakia and group III had smokers with leukoplakia. Each group had 15 subjects. 5 ml venous blood was obtained for the assessment of lycopene by high performance using liquid chromatography. **Results:** Out of 45 subjects, males were 25 and females were 20. The mean lycopene level in group I was 125.4 ng/ml, group II had 46.2 ng/ml and group III had 30.3 ng/ml. The difference was significant (P< 0.05). **Conclusion:** Patients with leukoplakia had low level of lycopene as compared to healthy subjects.

Key words: Leukoplakia, Lycopene, Smoking

Received: 24-01- 2019 Accepted: 28-02-2019

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This article may be cited as: Sharma A. Assessment of oral lycopene level in patients with oral leukoplakia. J Adv Med Dent Scie Res 2019;7(3):201-203.

INTRODUCTION

Oral leukoplakia is a diagnosis given to a white patch that cannot be categorised. Once a histological diagnosis is made, it is useful to refer to it either by causal factor, for example, candidal leukoplakia, or by degree of dysplasia.[1] An international meeting clarifying these definitions reported its findings and also suggested a method of staging these lesions.[2] This has been further commented upon by Van der Waal and Axell and Schepman and van der Waal and it is a pity that this study did not adopt this methodology. This staging not only includes the different forms of dysplasia but also takes into account the size of the lesion. A recent Cochrane systematic review on treatment of leukoplakia also provides some guidelines for future RCT in this field.[3] According to Warnakulasuriya et al[4], the new concept of OL shall acknowledge white lesions with questionable risk of being an OL, being excluded any other pathologies or known disorders which do not present potential malignant risk such as candidiasis, lupus erythematosus, lichen planus, hairy leukoplakia, frictional keratosis, nicotinic stomatitis, and leukoedema.[5]

Nonsurgical treatment may also be considered for the management of OL. This modality offers minimal adverse effects to patients, especially for patients with widespread OL that involves a large area of the oral mucosa or patients with medical problems and, consequently, high surgical risks. Lycopene is a carotenoid without provitamin A action. This is a fat-soluble red pigment found in some fruit and vegetables.[6] The present study was conducted to assess lycopene level in patients with oral leukoplakia.

MATERIALS & METHODS

The present study consisted of 45 patients of oral leukoplakia of both genders. All were enrolled with their written consent. All cases were clinically and histopathologically proven.

Data such as name, age, gender etc. was recorded. Histopathological grading was done according to severity of dysplasia as follows: Mild/Moderate/Severe epithelial dysplasia or Carcinoma in situ. Three groups were made. Group I had non- smokers, group II had smokers without leukoplakia and group III had smokers with

leukoplakia. Each group had 15 subjects. 5 ml venous blood was obtained for the assessment of lycopene by high performance using liquid chromatography. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 45		
Gender	**Males**	**Females**
Number	25	20

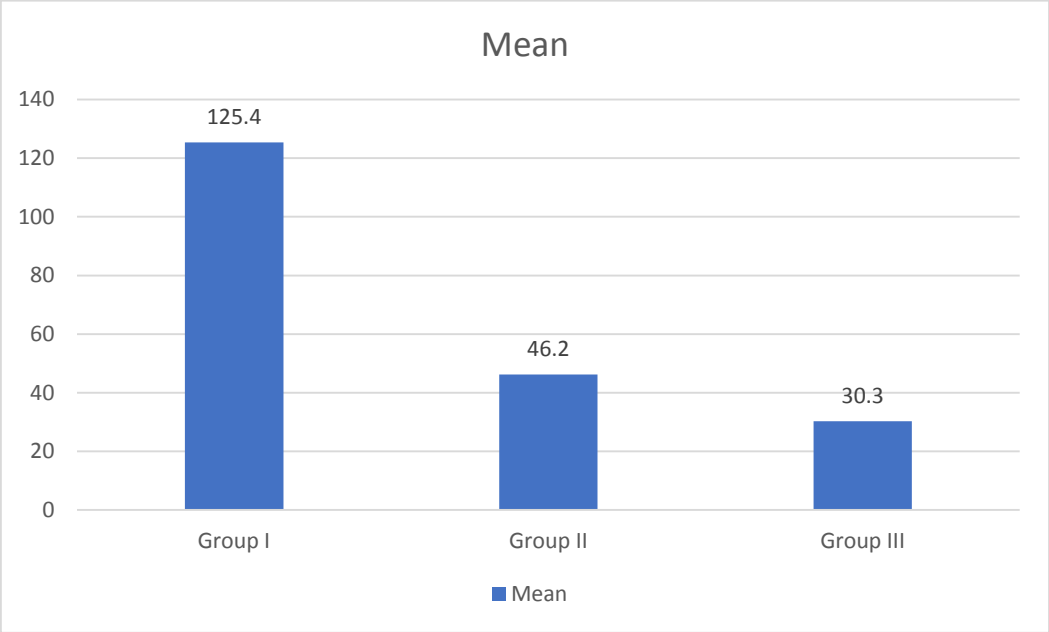
Table I shows that out of 45 subjects, males were 25 and females were 20.

Table II Determination of plasma lycopene level

Group	Mean	P value
Group I	125.4	0.01
Group II	46.2	
Group III	30.3	

Table III, graph I shows that mean lycopene level in group I was 125.4 ng/ml, group II had 46.2 ng/ml and group III had 30.3 ng/ml. The difference was significant (P< 0.05).

Graph I Determination of plasma lycopene level



DISCUSSION

Oral leukoplakia (OL) is a premalignant lesion described as "a predominant white lesion of the oral mucosa which cannot be defined as any other known lesion."[7] According to WHO 1997 Leukoplakia is defined as "a predominantly white lesion of the oral mucosa that cannot be characterized as any other definable lesion." It is now categorized under potentially malignant disorders.[8] It is now categorized under potentially malignant disorders.[9] Malignant potential of leukoplakia was hinted by Sugar and Banoczy way back in 1957. Association between tobacco chewing and smoking with oral leukoplakia is established beyond doubt. Tobacco smoke contains NOO radicals, which are carcinogenic.[10] Free radical scavengers should be the necessary part of the treatment regimen in tobacco chewers or smokers to prevent the formation, induce the remission or inhibit the progression of pre-cancerous lesions into malignancies.[11] The present study was conducted to assess lycopene level in patients with oral leukoplakia.

In present study, out of 45 subjects, males were 25 and females were 20. Zakrzewska et al[12] conducted a randomised controlled trial (RCT) of the treatment of oral leukoplakia with the carotenoid lycopene. A total of 58 patients received either 8 mg oral lycopene in two doses daily (*n*=20), 4 mg oral lycopene in two doses daily (*n*=18) or placebo capsules (*n*=18), for a 3-month period. Progress of patients was followed for a further 2 months. An objective clinical response, evaluated by bidimensional measurement of the lesion and colour photography, was classified as complete, partial, stable or progression. Histological status was categorised and ranked as normal (0), atypical hyperplasia (1), mild dysplasia (2), moderate

dysplasia (3) or severe dysplasia (4). Histological response was then described by the change in rank, for example, from moderate dysplasia (3) to atypical hyperplasia (1) would indicate an improvement of 2 units. There was no significant difference in the clinical response of people who took 8 mg lycopene compared with those taking 4 mg lycopene. The clinical responses measured in both these groups were significantly greater, however, than those in the control group (P<0.01). The response, assessed histologically, after the 8-mg lycopene treatment was significantly better than that from 4 mg lycopene (P<0.05) and than the response seen in the control group (P<0.001). Patients taking 4 mg lycopene also responded significantly better than those in the control group (P<0.05).

We observed that mean lycopene level in group I was 125.4 ng/ml, group II had 46.2 ng/ml and group III had 30.3 ng/ml. Singh et al[13] conducted a study in which a total of 58 patients received either 8 mg oral lycopene in two doses daily (n = 20), 4 mg oral lycopene in two doses daily (n = 18) or placebo capsules (n = 18), for a 3-month period. Progress of patients was followed for a further 2 months. Histological status was categorised and ranked as normal (0), atypical hyperplasia (1), mild dysplasia (2), moderate dysplasia (3) or severe dysplasia (4). Histological response was then described by the change in rank, for example, from moderate dysplasia (3) to atypical hyperplasia (1) would indicate an improvement of 2 units. Results There was no significant difference in the clinical response of people who took 8 mg lycopene compared with those taking 4 mg lycopene. The clinical responses measured in both these groups were significantly greater, however, than those in the control group (P<0.01). The response, assessed histologically, after the 8-mg lycopene treatment was significantly better than that from 4 mg lycopene and than the response seen in the control group (P<0.001). Patients taking 4 mg lycopene also responded significantly better than those in the control group.

Shivakumar et al[14] in their study a total of 180 individuals were included in the study with two main groups namely cases and controls: clinically/ histopathologically proven cases of oral leukoplakia (60) and age and sex matched control group divided into two categories non-smokers (60) and smokers without leukoplakia (60). The age of the patients varied between 31-70 years. Mean plasma lycopene levels for the leukoplakia patients (smokers) was 32.86±21.42 ng/ml, and for controls who were smokers it was 42.70±26.54 ng/ml, however the mean levels for non-smokers was 146.6±52.45 ng/ml which was significantly more.

CONCLUSION

Authors found that the patients with leukoplakia had low level of lycopene as compared to healthy subjects.

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