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TO ASSESS THE ROLE OF LYCOPENE IN IMPROVING MOUTH OPENING IN ORAL SUBMUCOUS FIBROSIS

Pathology

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ABSTRACT

Introduction: Oral Submucous Fibrosis is a premalignant condition involving the oral cavity & pharynx. It predominantly occurs in the Indian subcontinent where the habit is more prevalent. The malignant potential and the origin of cancer were attributed to the generalized epithelial atrophy associated with OSMF. Carotenoids & lycopene has antioxidant activity which proved to be efficient in the management of premalignancy.
Materials & Methods: 25 patients were included in the study who were clinically and histopathologically diagnosed as oral submucous fibrosis. They were supplemented with capsule Lycobig 5mg in BID dosage for 90 days along with mouth exercises and complete withdrawal of oral chewing habits.
Results: The 25 OSMF subjects were divided into 3 clinical stages. In stage I with mouth opening of > 36 mm there were 3 (12%) subjects, stage II with mouth opening of 35-26 mm had 10 (40%) subjects, stage III with mouth opening of 25-15 mm had 12 (48%) subjects.
Aims & Objectives: The main of this study is to determine the effect of lycopene on the clinical stages of Oral Submucous Fibrosis.

KEYWORDS

Oral submucous fibrosis, lycopene, carotenoids.

Introduction

Oral Submucous Fibrosis is one of the premalignant condition involving the oral cavity & pharynx. It is a chronic, progressive, scarring disease that predominantly affects the people in India and Southeast Asia. The disease was first termed as Atrophia Idiopathica Mucosae Oris & was reported by Schwartz.[2]ISeveral factors such as chilli consumption, nutritional deficiency, genetic susceptibility, autoimmunity and collagen disorders have been suggested to be involved in the pathogenesis of this condition. The malignant potential and the origin of cancer were attributed to the generalized epithelial atrophy associated with OSMF.[3]

Carotenoids are natural pigments synthesized by plants & are responsible for the colours of fruits & vegetables. Lycopene is the predominant carotenoid in the tomatoes and tomato products. This antioxidant activity is a potential mechanism by which lycopene may contribute to the prevention of a variety of cancers and other diseases.[4]

The present study also highlights the benefits of fresh fruits, vegetables & nutritional supplements for both prevention and treatment of diseases.

Materials & Methods

The study group comprised of 25 patients who were clinically and histopathologically diagnosed as oral submucous fibrosis. All the 25 patients with OSMF were supplemented with capsule Lycobig 5mg in BID dosage for 90 days along with mouth exercises and complete abstinence of oral chewing habits. A positive history of chewing arecanut, patients clinically & histopathologically diagnosed as oral submucous fibrosis with burning sensation and restricted mouth opening and well cooperative patients was included in the present study.

The clinical examination was carried out following the method described by Kerr, Ash and Millard.[5] The patients personal history was recorded according to the different chewing habits like, pan, tobacco and gutkha chewing, duration and frequency of chewing. Symptoms like burning sensation to normal food or spicy food and its duration, restricted mouth opening was noted. Extraorally clinical signs like interincisal mouth opening was measured using Vernier caliper from the mesio-incisal angle of upper central incisor to the mesio-incisal angle of lower central incisor and recorded in millimeters. Intraorally, different sites were examined for blanching, consistency, and fibrous bands in the buccal mucosa.

Clinically subjects were grouped into four categories, according to the clinical staging of Khanna J.N. et al (1995).[2,6]

Group I : Very early case – mouth opening > 36 mm

Group II : Early cases – mouth opening 26 – 35 mm

Group III : Moderately advanced cases - mouth opening 15 – 25 mm

Group IV a : Advanced cases – mouth opening 2-15 mm

Group IVb : Advanced cases with premalignant changes and malignant transformation

Results

The mouth opening was restricted in 24 (98%) subjects. Majority of subjects were in clinical stage II 10 (40%) and stage III 12 (48%). There were 3 (12%) subjects in clinical stage I. (Table 1). Statistically significant change in mouth opening (mm) was seen when post-treatment mean was compared with pre-treatment scores ($p<0.001$). Before treatment mean mouth opening was 26.42±6.11 mm which became 28.58±6.828 mm after 90 days of treatment. (Table 2).

Table 1: Clinical Staging

S.No.	Stage	No. of Patients	Percentage
1.	I	3	12
2.	II	10	40
3.	III	24	48

Table 2: Comparison of Mouth opening before and after treatment (mm)

S.No.		Mean	SD
1.	Before treatment	26.42	6.11
2.	After treatment	28.58	6.828
Before treatment vs After treatment change in mouth opening		t=5.742; p<0.001	

Table 3: Clinical Staging versus Improvement in Mouth Opening

S.No.	Clinical Stage	Mean	SD
1.	Stage I (n=3)	2.24	7.13
2.	Stage II (n= 10)	10.15	11.49
3.	Stage III (n= 12)	8.37	9.28
	Stage I vs II	t=1.584; p=0.126	
	Stage I vs III	t=1.502; p=0.144	
	Stage II vs III	t=0.569; p=0.572	

Discussion

The oral mucous membrane is a unique tissue which is continuously exposed to various kinds of stressors such as heat, cold, microorganisms, chemicals & mechanical irritations in the process of food intake. In response to these stressors both epithelial and connective tissue layers of oral mucosa also exhibit acute & chronic reactive changes. [7]OSMF is a chronic progressive and irreversible

disease affecting the oral, oropharyngeal and sometimes esophageal mucosa.[8]

A plethora of treatments have been advocated, hypothesized and justified by different workers. Treatment needs to be coupled with cessation of oral habits and daily mouth exercises in order to manage the early and advanced cases. Lycopene is very potent antioxidant present mainly in tomato and tomato products.[9,10] It has been shown to inhibit the premalignant and malignant tumour cell growth.[11] It has also shown potent benefits in leukoplakia, lichen planus and oral submucous fibrosis.

In the present study, the mouth opening was restricted in 24 (98%) subjects which is comparable to 97.02% of Tupkari J.V. *et al.* (2007).[12] When the fibrous bands are laid down submucosally, the blood supply to the epithelium will be compromised resulting in epithelial atrophy and increased permeability of the epithelium to the irritants. Also there could be ulceration and atrophy of the papillae of the tongue. In normal individuals mouth opening ranges from 35 to 55 mm. In the present study 24 (98%) patients had restricted mouth opening. The 25 OSMF subjects were divided into 3 clinical stages proposed by Khanna *et al*. In stage I with mouth opening of > 36 mm there were 3 (12%) subjects, which was in contrast to 3 (3%) subjects reported by Khanna *et al.* (1995)[6] in stage II with mouth opening of 35-26 mm there were 10 (40%) subjects, as compared to 22 (22%) subjects by Khanna *et al.* (1995)[6] the stage III with mouth opening of 25-15 mm were 12 (48%) subjects, as compared to 42 (42%) subjects by Khanna *et al.* (1995)[6]. Majority of subjects were in clinical stage II (40%) and III (48%). There were 3 (12%) subjects in clinical staging I.

In the present study the mean mouth opening was 26.42±6.11 mm which became 28.58±6.828 mm after 90 days of treatment. The change in the mouth opening was considered very highly significant ($p<0.001$). Kumar *et al.* (2006)[13] also observed an improvement of 5.25 ± 3.25 mm with an average gain of 3.4 mm, Gupta S *et al.* (2004)[14] reported improvement in mouth opening from 16+0.7 to 24 + 0.3 mm.

Conclusion

Oral Submucous fibrosis is a disease with high degree of morbidity. It also carries a significant mortality rate of oral cancer. As no effective surgical and medical treatment is presently available for this clinical condition, but administration of nutrient antioxidants have proven to have a protecting effect at an early stage and with a significant clinical improvement in OSMF. Oral Lycopene was seen to be efficacious , safe, noninvasive treatment modality for oral submucous fibrosis. It was proven to yield significant improvement in signs and symptoms of the disease. So a long term follow up study of the patients to fix the dose and duration of therapy is necessary to validate the use of such therapy in OSMF cases and prevent malignant transformation

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