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Efficacy of Turmeric in Reducing Burning Sensation in Oral Submucous Fibrosis: An Observational Study

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Abstract: Potentially malignant disorders and oral cancer are common diseases effecting oral cavity. The survival rate of these patients has not much improved, inspite of advances in the treatment modalities, due to their adverse effects. Many alternative medicines such as turmeric, aloevera, neem, tulsi, green tea, photo dynamic therapy, CO2 laser and stem cell culture etc are used to overcome these adverse effects. The aim of this study is to investigate the efficacy of turmeric along with honey in reducing the burning sensation in oral submucous fibrosis. Clinically diagnosed 30 patients of Oral Submucous Fibrosis (OSMF) were selected and local application of turmeric and honey was advised. Burning sensation using VAS scale was evaluated after 30 days. Statistical analysis was done using't' test. There was significant decrease in VAS scale after treatment. In our study turmeric and honey showed positive results in reducing burning sensation in OSMF.
Keywords: OSMF, burning sensation, turmeric, VAS scale

INTRODUCTION

Nature has provided us with a variety of treatment modalities in the form of food. Only in the past 60 years we have forgotten our medicinal "roots" in favor of patented medicines. We should not overlook the well-documented, non-toxic and inexpensive healing properties of food. There are hundreds of extremely nutritious foods and many of them consist of ingredients with hidden pharmaceutical qualities ranging from anti-inflammatory to anti-carcinogenic agent. They not only boost our innate immunity but also act as an adjunct to medicines for specific treatment [1].

A diet rich in vegetables, fruits, and spices is able to prevent at least 20% of all cancers. According to a World Health Organization (WHO) report, approximately 15% of oropharyngeal cancers can be attributed to dietary deficiencies or imbalances. There is a strong influence of low intake of antioxidants and fibers on oral squamous cell carcinoma in USA, Asia, and Europe. Numerous studies revealed that they act as chemopreventive and chemotherapeutic agents [2, 3].

Turmeric also called curcumin is yellow orange spice derived from family of curcuma longa belonging to the family Zingiberaceae. Curcumin is considered safe, nontoxic and effective alternative drugs because of its effects on various systems and therapeutic properties. The main ingredients in curcumin are curcuminoids, which has anti-inflammatory, antioxidant, anti-microbial, neuro-protective, cardioprotective, and anti-tumor actions [4].

Curcumin has been shown to suppress transformation, proliferation, and spread of tumor to distant sites. It regulates transcription factors, growth factors, inflammatory cytokines, protein kinases, and various enzymes. The proliferation of cancer cells is inhibited by inducing apoptosis and arresting cells in different stages of cell cycle [5]. Curcumin also shows antiviral property by inhibition of HIV-1 and HIV-2 proteases, reduction of HSV-1 replication, and suppressing transcription of HPV-18 [6]. The present study deals with the effects of turmeric in reducing the burning sensation of individual with clinical and histopathological diagnosis of Oral Submucous Fibrosis. This study is also of interest as it offers a non invasive & safe alternative or adjunct to conventional therapies & highlights the benefits of turmeric as nutritional supplements for both prevention and treatment of diseases.

MATERIALS & METHODS

The study was conducted in the Department of Oral Medicine & Radiology after gaining approval from the ethical committee. 42 patients were selected who presented with signs and symptoms suggestive of OSMF. Among these 42 patients, 4 patients had a positive medical history, 3 patients lost to follow up,

another 2 patients had other oral mucosal lesions along with OSMF, 3 subjects did not agree for the biopsy procedure. So the study group comprised of 30 patients who were clinically and histopathologically diagnosed as oral submucous fibrosis. Patients were involved irrespective of age, gender, occupation, social status, ethnicity, and stages of OSMF. All the patients who were already undergoing some OSMF treatment and some systemic diseases were excluded from the study. The selected patients gave positive history of smoked/smokeless tobacco and burning sensation. Details of habits of the patients were recorded. A written consent of the participants was taken on an ethical format regarding their participation in the study. The study involved the use of visual analog scale (VAS) to record the severity of burning sensation in the individual patients. The burning sensation was noted on VAS scale on the first visit. The patients were given tablet Turmix, twice daily for 30 days along with the topical application of turmeric and honey in a paste form by cotton applicator 2–3 times daily. After 30 days, patients were recalled and the VAS score was recorded. The results showed significant decrease in VAS value after the treatment. The data was than statistically analysed using students 't' test.

RESULTS

In this study 30 patients of OSMF were selected out of which 24 were males and 6 were females. Age of the selected subjects varied between 20-52 years. On the first day burning sensation was recorded on VAS scale. After 30 days of treatment with turmeric, there was statistically significant improvement and reduction in burning sensation. Mean burning sensation before treatment was 6.31±1.12 and after the treatment was 2.37±0.95. The student's 't' value was 14.61 and p-value was < .00001. Results were found to be statistically significant at P<0.5 (Table 1).

Table 1: Statistical analysis before and after treatment on VAS scale

OSMF	n	Mean	Variance	SD	t-value	p-value	Significance
Before treatment	30	6.31	1.26	±1.123	14.61	<.00001	Significant
After treatment	30	2.37	0.91	±0.955			

DISCUSSION

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 [7]. The disease was first termed as Atrophia Idiopathica Mucosae Oris & was reported by Schwartz. The definition, which is most widely accepted, was stated by Pindborg J.J. and Sirsat S.M. [8]. The disease is characterized by blanching and stiffness of oral mucosa, trismus, burning sensation, loss of mobility of tongue and loss of gustatory sensation. Majority of these cases are seen in Indian population. The prevalence varies from 0.20-0.5% in India with a higher percentage being found in the southern parts of the country. A variety of physiological factors have been associated with it including betel nut chewing, capsasin, autoimmunity and genetic predisposition. The OSMF, if not treated can progress to oral cancer. The conversion rate is about 2-10% [9].

Turmeric is a golden herb consisting of many medicinal properties and is an effective source of treatment for various diseases since ancient times. It is a perennial plant, known as Circuma longa, which is a member of the ginger family, 'Zingaberaceae'. The active constituent of turmeric is known as curcumin. After consumption of curcumin, it undergoes intestinal metabolism and is absorbed, and excreted in bile [10]. Curcumin is insoluble in water, but soluble in ethanol and acetone. The naturally occurring ratios of curcuminoids in curcumin are about 5% bisdemethoxycurcumin, 15% demethoxycurcumin, and 80% curcumin. Curcumin has a chemopreventive effect on oral precancerous lesions like oral leukoplakia, oral lichen planus and oral submucous fibrosis. A study using OL lesion showed that curcumin reduced the size of a lesion by 10% in the treated 62 patients. In OSMF, curcumin reduces the micronuclei formation in exfoliated mucosal cells and in circulating lymphocytes. It can prevent and reduce the formation of fibrosis by acting as an antifibrotic agent in OSMF. Its mode of action is by blocking leukocyte influx and inhibiting the activation of inflammatory cells [11].

One new treatment modality which is gaining recognition is the use of turmeric in OSMF. Various studies have also been conducted worldwide to show the therapeutic effect of curcumin on OSMF. In a study conducted by Hastak *et al*, patients suffering from sub mucous fibrosis were given a total oral dose of turmeric oil (600 mg turmeric oil mixed with 3 g turmeric / day), turmeric oleoresin (600 mg + 3 g turmeric day) and 3 g turmeric /day as a control for 3 months. It was observed that all three-treatment modalities decreased the number of micro nucleated cells both in exfoliated oral mucosal cells and in circulating lymphocytes. Turmeric oleoresin was found to be more effective in reducing the number of micronuclei in oral mucosal cells, but in circulating lymphocytes the decrease in micronuclei was comparable in all three groups [12].

In the present study, tablet Turmix was given two times a day to the patient along with local application of turmeric mixed with honey 2-3 times daily for 30 days. This treatment modality showed

significant improvement in reducing the burning sensation in patients which was measured on VAS scale. Our results were found to be in consistent with various other studies quoted in the literature.

Deepa et al. in 2010 conducted a comparative study on the efficacy of curcumin capsules and turmeric oil as chemopreventive agents in oral submucous fibrosis and the results of this study were in concordance with their study with the decrease in burning sensation on VAS scale after treatment period of 15 days [13].

In a study conducted by agarwal et al when 30 patients were administered turmeric thrice daily for three months, an improvement in mouth opening and burning sensation was noticed and it was also observed that maximum improvement was evident in that group where the severity of fibrosis and inflammation was maximum. Curcumin exerts anti-inflammatory and fibrinolytic activity by inhibiting a number of different molecules that participate in the process of inflammation and by inhibiting lipid peroxidation and check cellular proliferation, thereby reducing the rate of collagen synthesis [14].

Another study done by Gupta et al on inhibitory activity of curcumin on inhibitor of Kappa B Kinase (IκBK) an enzyme responsible for NFκB activation, the authors found that there was a reduction of IκBK activity in head and neck squamous cell carcinoma (HNSSC) [15].

According to a review given by Nagpal and Sood, its role in the treatment of various precancerous conditions like oral submucous fibrosis, leukoplakia, and lichen planus has also been studied. Turmeric extract and turmeric oil have demonstrated oncopreventive activity in *in vitro* and *in vivo* animal experiments. The local symptoms of burning sensation and pain were reduced and partial reversal of opening of the mouth was also observed [16].

Jurenka conducted a study in which phase 1 trial was done among 25 patients to assess the efficacy of curcumin in preventing the progression of different potentially malignant disorders. The initial dose given was 500 mg daily which was later increased to 8 g daily for duration of 3 months. Histopathological examination showed decrease in hyperkeratosis, parakeratosis, inflammation and dysplasia [17]. In our study, the dose of tablet Turmix given was fixed for 30 days for 30 patients but histopathological examination was not done. In a study conducted by Keshari *et al* topical curcumin was found to be efficacious in controlling the signs and symptoms of OLP. All the parameters studied namely pain, erythema, and ulceration associated with OLP showed statistically significant improvement with topical curcumin therapy and thus topical curcumin was found to be safe at the prescribed dose, i.e. 99% curcumin in gel base. No adverse effects were reported with the use of curcumin [18]. The results of the study conducted by Srivasatav *et al* showed that the synergistic action of tulsi and turmeric herbs results in higher efficacy and highly potent anti-OSMF treatment. Treatment with these drugs produces an early, sustained and significant fall in burning sensation, clinically and statistically as soon as one month. Mouth opening was also significantly improved. Results were better in severe cases reflecting its higher efficacy [19].

Another study conducted by Yadav M et al forty patients with clinically and histologically proven Oral Submucous Fibrosis were selected and were divided into 2 groups. The first group was treated with weekly intralesional injection of 4 mg Dexamethasone & 1500 I.U Hyaluronidase and the second group by oral administration of two Curcumin tablets (Turmix 300 mg) per day for 3 months each. Improvement of burning sensation, interincisal distance and tongue protrusion was evaluated on a weekly basis. Burning sensation improved in both the groups from early to late stages and complete resolution of burning sensation was also noted with turmix [20]. Thirty clinically diagnosed OSF patients were divided into two groups in a study conducted by Hazaray *et al*, 15 patients in each group. Test group patients were treated with Longvida (curcumin) lozenges and control group with Tenovate ointment (clobetasol propionate (0.05%). The treatment was given for 3 months duration and follow-up was done for 6 months. Both the groups were advised for physiotherapy exercises by mouth exercise device. The baseline and follow-up results were compared for IIO (interincisal distance on maximum mouth opening), Visual Analogue Scale (VAS) for normal food and VAS for spicy food. The test group showed significant increase in mouth opening as compare to controls. In relation to VAS scale with spicy and normal food the average reduction was more in test group as compare to control group. Thus it can be concluded that combination strategies for the management of OSF which include the stoppage of causative ill habits, appropriate medicinal and physiotherapy management is more efficient than single therapeutic modality. It is also evident from the study that curcumin holds good promise in the treatment of OSF in future [21].

CONCLUSION

We can conclude that turmeric has a beneficial therapeutic effect in patients diagnosed with OSMF. Turmeric is considered to be safe, inexpensive, easily available, non toxic and effective alternative as compare to many other conventional drugs. Its role in the treatment of premalignant lesions and conditions including oral cancer is very promising. This being a prospective study, hence results are more reliable. But since this was a short-term study, further research is

needed with a larger sample size over long term to achieve more definite results. Also, there are other signs and symptoms of OSMF and in this study only burning sensation was considered.

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