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Effect of Turmeric on Inflammation in Lichen Planus

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Abstract

Oral lichen planus (OLP) is a chronic disease that may persist in some patients for a long time. In contrast to cutaneous lichen planus, in some patients, the oral form may persist for up to 25 years It is a chronic, inflammatory disease that affects cutaneous and mucosal tissues. Turmeric and its ingredients curcumin are being studied as chemo preventive agent that inhibits the development of oral cancer, curcumin and essential oil of turmeric have been found to inhibit many diseases processes through their anti inflammatory, antioxidant and anticancer properties. Hence, in this study we planned to assess the effect of addition of turmeric to the standard medical treatment on inflammation in OLP. After getting clearance from institutional ethics committee, clinically diagnosed and histopathologically confirmed as patients of oral lichen planus patients will be recruited from Santosh Dental College & Hospitals. Then the control group (CG) (n = 60) patients were treated with conventional medical therapy, whereas turmeric group (TG) (n = 60). Inflammatory markers used to assess the levels of inflammation before and after the treatment are high sensitive C reaction proteins (hsCRP), tumor necrosis factor alpha (TNF alpha), Interleukin 2 (IL 2) and Interleukin 6 (IL 6). From this study, it is concluded that, as OLP is a chronic condition affecting of the Indian population. Steroids have been the drugs of choice in the treatment of lichen planus whether topical or systemic. Their hazards and side effects and contraindications are well known. Addition of turmeric in addition to standard medical treatment not only improves the clinical presentation, but also reduces the inflammation.

Keywords: Lichen planus, interleukins, inflammatory markers.

Introduction

Lichen planus is common mucocutaneous disease, it was first described by Wilson in 1869 and is thought to affect 0.5 – 1% of the world's population [1]. This condition may affect either the mucosa or skin or both. About 50% of the patients with skin lesions may have oral lesions, whereas about 25% present with oral lesions alone [2], [3]. Oral lichen planus (OLP) is a chronic disease that may persist in some patients for a long time. In contrast to cutaneous lichen planus, in

some patients, the oral form may persist for up to 25 years [3]. It is a chronic, inflammatory disease that affects cutaneous and mucosal tissues [4]. OLP is a disease of adulthood and children are rarely affected [5]. It is usually observed in 'highly-strung', nervous people [6] . It may exist anywhere in the oral cavity. The tounge, buccal mucosa and gingival are the most common sites, whereas palatal lesions are uncommon [7].

Several intervention regimens have been standardized to improve management of symptomatic OLP. However, permanent cure is not possible achieved. Patients suffering with OLP are usually exposed to long durations of medical treatment. The drugs of the choice are immunosuppressive agents. They may be used locally or systemically, cyclosporine, azathioprine and retinoid. These immunosuppressive agents affects the severity and progression of OLP, but theotrically they could also trigger malignant transformation [8].

The extract of curcumin plant have been a major ingredient of medical since the time immemorial. It has been attributed a number of medicinal properties in the traditional systems of the medicine. Turmeric and its ingredients curcumin are being studied as chemo preventive agent that inhibits the development of oral cancer, curcumin and essential oil of turmeric have been found to inhibit many diseases processes through their ant inflammatory, antioxidant and anticancer properties. Hence this was under taken to investigate the role of curcumin longa as an alternative means of treatment of the oral lichen planus [9]. Hence, in this study we planned to assess the effect of addition of turmeric to the standard medical treatment on inflammation in OLP.

Materials and Methods

After getting clearance from institutional ethics committee, Clinically diagnosed and histopathologically confirmed as patients of oral lichen planus patients will be recruited from Santosh Dental College & Hospitals. Then the control group (CG) (n = 60) patients were treated with conventional medical therapy, whereas turmeric group (TG) (n = 60) were asked to apply turmeric powder on the affected and intake of Standardized powder (curcumin): 400 - 600 mg, 3 times per day [10] in addition to conventional medical therapy.

Inflammatory markers used to assess the levels of inflammation before and after the treatment are high sensitive C reaction proteins (hsCRP), tumor necrosis factor alpha (TNF alpha), Interleukin 2 (IL 2) and Interleukin 6 (IL 6).

Patients, resenting with systemic disease, pregnancy, lactation, patients on long term corticosteroid therapy, patient undergoing radiation treatment, patients not willing to sign the consent and are not voluntarily willing to participate in the study were excluded from the study.

5ml of blood was collected through venipuncture, and allowed to clot and centrifuge at 3,000 RPM at 4o C for 10 min (Remi - refrigerated centrifuge) from which the serum will be separated and stored in a frozen state at – 80^{o}C for analysis of inflammatory markers by the Kits.

Results

The baseline and clinical characteristics of both groups are depicted in Table 1. There were no significant differences in the baseline characteristics like age, height, weight, heart rate and blood pressure in between the groups.

As shown in Table 2, In the CG, when inflammatory markers were compared before and after 12 weeks of

medical treatment, there was slight reduction of inflammatory markers. But they were not statistically significant. However, in TG, inflammatory markers hs CRP ($p<0.001$), TNF alpha ($p<0.001$) , IL 6 ($p<0.001$) , IL 2 ($p<0.001$).

As shown in Table 3, between group comparisons from pre to post interventions showed significantly high in TG (hsCRP: $p<0.001$, TNF alpha: $p<0.001$, IL2: $p<0.001$, IL6: $p<0.001$).

Discussion

Oral lichen planus (OLP) is a chronic inflammatory condition characterized by mucosal lesions of varying appearance and severity [11].

It has a prevalence rate of 2.6% in the Indian population [11]. It tends to be more persistent and more resistant to treatment [4]

The clinical presentation of OLP ranges from mild painless white keratotic lesions to painful erosions and ulcerations. Oral lichen planus is classified into reticular, erosive, atrophic, and bullous types [12]

The treatment of oral lichen planus is corticosteroids which are widely used and the dosage depends on the severity of the lesion. The frequent use and misuse of currently used therapeutic agents has led to the evolution of resistant strains of common

pathogens as well as increased incidence of adverse effects associated with their usage. So the search for the alternative medicinal treatment is still going on. Medicinal plants have been used as a traditional treatment agent for numerous human diseases in many parts of world. In rural areas of developing countries, they continue to be used as the primary source of medicine. About 80% of people in developing countries use traditional medicines for their health care [13].

In this study, TG group patients were advised to avoid spicy food, along with a healthy diet rich in fresh fruit and vegetables. They were educated and motivated regarding a proper plaque control regimen, which included tooth brushing twice daily with a soft brush and toothpaste. Counseling was given to educate the benefits of curcumin and told that many patients responded to curcumin at varying doses of its usage. On using curcumin at the 1st week recall visit, the patient reported slight decrease in the size of lesion with no symptoms of discomfort to curcumin. At the 2nd week recall visit, further improvement were noticed in many patients in the regression of lesion. Oral hygiene instructions were reinforced. During the end of 3rd week follow up, they were asked to taper the dose with once a day 500 mg curcumin capsule for 2 weeks. After 5th week, patients again came to the department for routine follow up. There were no symptoms of discomfort and no clinical sign of the lesion. No side effect were reported after one month of continuous usage of curcumin. After a month, the dose was further tapered to 250mg of curcumin for the next two weeks. Then local application of curcumin paste was started for one month. The patients were kept on follow up for 3 months. On subsequent follow up for 3 months buccal mucosa no evidence of lesion were seen and patients didn't show any sign of discomfort.

Turmeric, a golden spice is obtained from the rhizome of the plant Curcuma longa and traditionally used to provide color and taste in food since ancient times [14].

Turmeric is composed of three curcuminoids (curcumin, desmethoxycurcumin, bisdemethoxycurcumin) Although it was long believed

that Turmeric was responsible for the beneficial health effects, research today has narrowed its focus to the component of Curcumin, as being primarily responsible. In fact, it is this agent that has been shown to regulate numerous transcription factors, cytokines, protein kinases, adhesion molecules, redox status and enzymes that have been linked to inflammation [15].

Curcumin, the major constituent of Curcuma longa, and a dietbased yellow color agent found in Turmeric has many scientific and health benefits. Curcumin is a Polyphenol with a lipophilic structure that is insoluble in water and stable in the acidic environment of the stomach [16]. It is a highly Pleotropic molecule that frequently interact s with other molecular particles in the inflammatory process and has-strong anti-oxidative properties.

It is postulated that, the antiinflammatory mechanism of curcumin in our study is a molecular response to the down-regulation of enzymatic activity of cyclooxygenase-2 (COX-2), lipoxygenase, and inducible nitric oxide synthase (iNOS). It also is modulated by other cell signaling activity involving cytokines, apoptotic proteins, NF-kB, 5-LOX, STAT3, reactive protein, prostaglandin E (2), adhesion molecules, creatinine; and a host of other critical molecules and enzymes [17].

Conclusion

From this study, it is concluded that, as OLP is a chronic condition affecting of the Indian population. Steroids have been the drugs of choice in the treatment of lichen planus whether topical or systemic. Their hazards and side effects and contraindications are well known. Addition of turmeric in addition to standard medical treatment not only improves the clinical presentation, but also reduces the inflammation.

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Legends Tables

Table 1: Patient's baseline characteristics.

Sl.no	Total No of Patients n=(120)	Control Group (n = 60)	Turmeric Group (n= 60)
1	Age (Years) (mean ± SD)	40.62 ± 5.25	41.23 ± 5.08
2	Height (cm) (mean ± SD)	163.58 ± 6.67	163.34 ± 6.57
3	Weight (kg) (mean ± SD)	70.22 ± 7.03	69.75 ± 6.93
4	Heart Rate (Beats per minute)	89.23 ± 6.36	89.90 ± 6.04
5	Systolic pressure (mmHg)	133.77 ± 7.04	135.45 ± 5.30
6	Diastolic pressure (mmHg)	87.35 ± 6.90	89.58 ± 5.55

Table 2. Within group differences of inflammatory markers.

Sl. No	Parameter	Control Group (n = 60)		Turmeric Group (n= 60)	
		Time = 0 month	Time = 3 months	Time = 0 month	Time = 3 months
1	hs CRP (ng/ml)	10454.47 ± 11525.93	7804.21 ± 2085.71	8855.05 ± 2192.25	5742.07 ± 2121.68 ***
2	TNF alpha (pg/ml)	211.63 ± 80.31	191.98 ± 76.34	229.15 ± 53.77	146.31 ± 49.74 ***
3	IL 6 (pg/ml)	312.18 ± 92.11	309.87 ± 90.25	302.60 ± 91.18	207.25 ± 57.11 ***
4	IL 2 (pg/ml)	45.32 ± 4.73	45.83 ± 5.28	45.95 ± 4.61	31.58 ± 4.90 ***

*** p<0.001.

Values are mean ± SD; hsCRP: high sensitive C reactive proteins; TNF alpha: Tumor necrosis factor alpha, IL 6: Interleukin 6, IL2: Interleukin 2.

Table 3. Between group differences of inflammatory markers.

Sl. No	Parameter	Mean % change from baseline	
		Control Group (n = 60)	Turmeric Group (n= 60)
1	hs CRP (ng/ml)	12.96 ⇩	35.23 *** ⇩
2	TNF alpha (pg/ml)	0.40 ⇩	33.18 *** ⇩
3	IL 6 (pg/ml)	0.06 ⇩	27.97 *** ⇩
4	IL 2 (pg/ml)	1.03 ⇩	30.82 *** ⇩

*** p<0.001.

hsCRP: high sensitive C reactive proteins; TNF alpha: Tumor necrosis factor alpha, IL 6: Interleukin 6, Interleukin 2.