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Effect of Turmeric on Oxidative Stress in Oral Lichen Planus

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Abstract

Introduction: Lichen Planus is a common muco cutaneous disease described by Wilson in 1869, can affect either mucosas, skin or both. About 50% patients both skin and oral lichens can be seen, however 25% present with only oral lichens and without skin manifastation. it has been suggested that increased reactive oxygen species (ROS) and lipid peroxides may play a part in the pathogenesis of OLP Hence this was under taken to investigate the role of turmeric in addition to standard medical treatment on oxidative stress in treatment of the oral lichen planus.

Materials and methods: 120 patients with proven diagnosis of Oral Lichen Planus (OLP) following ethical clearance from institute and after obtaining written consent were divided into 2 groups. CG (Control Group) comprised of 60 patients who underwent standard medical treatment with steroids. TG (Turmeric Group) comprised of 60 patients who were treated with curcumin.

Results: In the CG, when oxidative stress markers were compared before and after 12 weeks of medical treatment, there was slight reduction of TAOS and MDA, however, they were not significant. But in TG, TAOS was increased from 0.44 $\pm$ 0.16 to 0.55 $\pm$ 0.15 ($p<0.000$) and MDA was reduced from 4.19 $\pm$ 1.55 to 3.27 $\pm$ 1.32 ($p<0.001$).

Conclusion: From this study, it is concluded that turmeric not only improves the clinical presentation, but also reduces the oxidative stress

Keywords: Oxidative stress, lichen planus, total anti oxidant status, malodialdehyde.

Introduction

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 (1). 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 (2). It is a chronic, inflammatory disease that affects cutaneous and mucosal tissues (3). The clinical presentation of LP has several forms, including the actinic, hypertrophic, annular, erosive, follicular, linear, pigmented, and bullous types. It affects all races equally and presents mainly in the range from 30 to 70 years of age (4). The exact pathogenesis of the disease remains unclear, but both antibodies and T-cell mediation have been implicated. Activated T cells release cytokines leading to the attraction of inflammatory cells and the destruction of keratinocyte by cellmediated cytotoxicity (5). Recently it has been suggested that increased reactive oxygen species (ROS) and lipid peroxides may play a part in the pathogenesis of OLP (6). 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 (7).

Hence this was under taken to investigate the role of turmeric on oxidative stress in treatment of the oral lichen planus.

Materials and Methods

120 patients in the age group of 20-80 with proven diagnosis of Oral Lichen Planus (OLP) following ethical clearance from institute and after obtaining written consent were divided into 2 groups. Turmeric Group comprised of 60 paitents who underwent treatment with curcumin 400-600mgs, 3 times a day (8) along with topical application of turmeric on the affected area twice a day. Control Group (CG) comprised of 60 patients who underwent standard medical treatment with steroids both systemically and topically. Oxidative stress markers used to assess the levels of oxidative stress before and after the treatment are Total anti oxidant status (TAOS) and Malodialdehyde (MDA).

Patients, presenting 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 4^{o} C for 10 min (Remi - refrigerated centrifuge) from which the serum was separated and stored in a frozen state at – 80^{o}C for analysis of oxidative stress markers by the commercially available Kits.

Results

Among Anthropometric parameters (Table 1) including BP and HR, there was no significant difference between both groups. There was slight reduction of TAOS and MDA, however, they were not significant. But in TG, TAOS was increased from 0.44 ± 0.16 to 0.55 ± 0.15 ($p<0.000$) and MDA was reduced from 4.19 ± 1.55 to 3.27 ± 1.32 ($p<0.001$) (Table 2).

Discussion

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 (9). 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 (10), (2). 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 (2). Recently it has been suggested that increased reactive oxygen species (ROS) and lipid peroxides may play a part in the pathogenesis of OLP (6)

Anshumalee et al. (11) reported that oxidative stress may play a role in oral LP. Moreover, Sezer et al. (6) reported that there was increased oxidative stress and lipid peroxidation together with an imbalance in the antioxidant defense system in 40 patients suggesting that ROS may be involved in the pathogenesis of this disease.

As shown in Table 2, In the CG, when oxidative stress markers were compared before and after 12 weeks of medical treatment, there was slight reduction of TAOS and MDA, however, they were not significant. But in TG, TAOS was increased ($p<0.001$) and MDA was reduced ($p<0.001$).

The beneficial effect of curcumin is postulated as, Curcumin is a major yellow pigment in turmeric (the ground rhizome ofCurcuma longaLinn), which is widely used as a spice and coloring agent in several foods, such as curry, mustard and potato chips, as well as cosmetics and drugs. A wide range of biological and pharmacological activities of curcumin has been investigated (12). Curcumin is a potent inhibitor of mutagenesis and chemically induced carcinogenesis (13), (14). It possesses many therapeutic properties including anti-inflammatory and anticancer activities (15). Curcumin is currently attracting strong attention due to its antioxidant potential as well as its relatively low toxicity to rodents.

Curcuminoids also exhibited antioxidant activities in some in vitro lipid peroxidation systems (16) and suppressed 12-Otetradecanoylphorbol 13-acetate-induced hydrogen peroxide production and oxidized DNA formation in the mouse epidermis (17).

Conclusion

From this study, it is concluded that turmeric not only improves the clinical presentation, but also reduces the oxidative stress.

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Legends Tables

Table 1. Anthropometric Parameters.

S.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 Oxidative Stress Markers.

S. No	Parameter	Control Group (n = 60)		Turmeric Group (n= 60)	
		Time = 0 month	Time = 3 months	Time = 0 month	Time = 3 months
1	TAOS	0.49 ± 0.15	0.47 ± 0.15	0.44 ± 0.16	0.55 ± 0.15 ***
2	MDA	4.14 ± 1.45	4.10 ± 1.56	4.19 ± 1.55	3.27 ± 1.32 ***

*** $p<0.001$.

TAOS: Total anti oxidant status, MDA: Malondialdehyde.