

Efficacy of green blood therapy (wheat grass) juice in treatment of oral pre-cancerous lesion

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Abstract

Aim: The purpose of study to evaluate the efficacy of Wheatgrass juice in treatment of Oral Pre-Cancerous Lesion.

Methods: 60 Subjects diagnosed clinically of pre cancerous lesions (OSMF, Leukoplakia and Lichen planus) was who agreed selected from the department of Oral Medicine & Radiology, Career Post Graduate Institute Of Dental Sciences And Hospital, Lucknow, aged between 20-60 years that will fall under our study criteria as mentioned in inclusion and exclusion details.

The details of the subject like Size of the lesion, extent, mouth opening, tongue protrusion, blanching burning sensation and other features were recorded. All subjects participating in the study were provided wheat grass juice and instructed to take 20 ml of wheat grass juice empty stomach in the morning and 20 ml before night meal for a period of 3 months.

Statistical analysis and Results; Wheat grass give the promising result in Pre & Post treatment of OSMF, Leukoplakia, Lichen planus like Size of the lesion,

extent, mouth opening, tongue protrusion, blanching, burning sensation.

Conclusion: there was no further study have done in treatment of OSMF, Leukoplakia, Lichen Planus by the use of Wheat Grass Juice. Wheat grass give the promising result in Pre & Post treatment of Oral Pre- Cancerous lesion.

Keywords: Wheat Grass, Anticancer, Chlorophyll, Green Blood, Enzymes Superoxide Dismutase (SOD), Pre-Malignant Lesion, Reactive Oxygen Species (ROS)

Introduction

Shoot of *Triticum aestivum* Linn. (Hindi Name- gehun, kanak, Sanskrit name- godhuma) is called as a wheat grass¹. Wheatgrass is a rich source of tocopherols with high vitamin E potency. It is considered as a cleansing and purifying agent from ancient times and yet can be used for its healing properties because of its nutritional values. Wheat grass is also rich in chlorophyll. It is commonly known as the “green blood” due to its high chlorophyll content which accounts for 70% of its chemical constituents. The consumption of wheatgrass in the Western world began in the 1930s as a result of experiments conducted by Charles F. Schnabel in his attempts to popularize the plant². By 1940, cans of Schnabel's powdered grass were on sale in major drug stores throughout the United States and Canada. The major chemical constituents present in *Triticum aestivum* (Wheat Grass) are given below which make the wheat grass valuable in boosting the health and vitality³.

Wheat grass and cancer

Wheat grass also contains chlorophyll, which was found to be responsible for inhibiting the metabolic activation of carcinogens^{11, 12}. Wheat grass extract is known to contain antioxidant enzymes superoxide dismutase (SOD) and cytochrome oxidase that have the potential to convert

reactive oxygen species (ROS) to a hydrogen peroxide and an oxygen molecule. There are reports on the anti mutagenic effect of oxidative DNA damage towards benzo pyrene induced mutagenicity.

Antioxidant activity

The antioxidant activity of wheatgrass, which is consumed as a dietary supplement, was estimated at different levels. Wheat grass contains antioxidant enzyme super oxide dismutase (SOD) which converts dangerous free radical reactive oxygen species (ROS) into hydrogen peroxides (having extra oxygen molecule to kill cancer cells) and an oxygen molecule.

Oral Pre-malignant lesion are predominantly seen in Asian countries, prevalence being more in India, which can be associated to rise in consumption of tobacco in different form these lesion have higher malignant potential, so the early detection and management of these lesion can prevent the patient from mortality and morbidity and thus improving the quality of life. Although proponents of WGJ have recommended it for four decades as a treatment for various diseases, yet very little clinical data exists to support its use

Leukoplakia is one of the most common potentially malignant disorders of the oral cavity⁴. Malignant transformation of oral leukoplakia in annual average is 1% in different populations and geographic areas with the higher risk reported by 43%.The pooled estimated prevalence rate of oral leukoplakia in 2003 varied between 1.7 to 2.7% in general population. It has been reported that about 16% and 62% of oral squamous carcinomas are associated with oral leukoplakia⁵.

Oral submucous fibrosis (OSMF) is also called as ‘diffuse oral submucous fibrosis’, ‘idiopathic scleroderma of mouth’, ‘idiopathic palatal fibrosis’, ‘sclerosing stomatitis’, ‘juxta- epithelial fibrosis’, etc. It is a

potentially malignant disorder (PMD) and crippling condition of oral mucosa⁶. It was first reported by Schwartz in 1952 among five Indian females from Kenya and he designated the term 'Atropica Idiopathica Mucosae Oris' to this condition. In 1953, Joshi described this condition a 'Submucous fibrosis'. The prevalence of submucous fibrosis in random samples of the population in India is up to 0.4%. This indicates that there may be millions of individuals suffering from submucous fibrosis in the country.⁷

Oral lichen planus (OLP) is a chronic inflammatory disorder affecting stratified squamous epithelia. The disease is relatively common, affecting approximately 1–2% of the population an incidence equal to well-known diseases such as psoriasis and Barrett's esophagus⁸.

Aim and Objective

- The purpose of the study to evaluate the efficacy of wheat grass in treatment of oral pre-cancerous lesion. In forms of
1. Improvement in clinical symptoms of oral Leukoplakia, OSMF, Lichen Planus.
 2. Reduction in clinical size of the lesion pre-treatment v/s post treatment in regular follow up.
 3. Improvement in intra-incisal distance, Tongue protrusion, Blanching and Burning sensation in OSMF patient.

Selection Criteria

Inclusion Criteria

- Age: 20-60 years.
- Patient clinically diagnosed with pre-cancerous lesion.

Exclusion criteria

- Age: <20 yrs, >60 yrs

- Patient with chronic illness and systemic disease which are likely to alter the mucosa histopathologically.
- Pregnancy and lactating mother.

Material and methodology

A study was conducted with 60 selected patients in the outpatient department of Oral Medicine and radiology, Career Post graduate institute of dental sciences and hospital. Lesions were diagnosed on the basis of clinical features. The patients were divided into 3 groups.

Leukoplakia – leukoplakia was diagnosed according to its size, shape, appearance.

Classification of lesion (According to Ongole 12th edition)⁹

L1: size if single or multiple leukoplakia together <2 cm

L2: size if single or multiple leukoplakia together 2-4 cm

L3: size if single or multiple leukoplakia together >4 cm,

Lx: size not specified.

OSMF: OSMF was diagnosed according to its clinical features inter-incisal distance, tongue protrusion, burning sensation. Classification of osmf (According to Khanna JN and Andrade NN (1995)¹⁰

Grade I: Very early cases: Common symptom is burning sensation in the mouth, acute ulceration and recurrent stomatitis and not associated with mouth opening limitation.

Grade II: Early cases—Buccal mucosa appears mottled and marble like, widespread sheets of fibrosis palpable, interincisal distance of 26 to 35 mm.

Grade III: Moderately advanced cases—Trismus, interincisal distance of 15 to 25 mm, buccal mucosa appears pale firmly attached to underlying tissues, atrophy of vermilion border, vertical fibrous bands palpable at the soft palate, pterygomandibular raphe and anterior facial pillar.

Grade- IVA: Advanced cases—severe Trismus, interincisal distance of less than 15 mm, thickened faucial pillars, shrunken uvula, restricted tongue movement, presence of circular band around entire lip and mouth.

Grade- IVB: Advanced cases—presence of hyperkeratotic leukoplakia and/or squamous cell carcinoma.

Oral Lichen Planus: Oral lichen planus was diagnosed according to its size, burning sensation.

Classification of oral lichen planus (According to on gale 12th edition.)

Grading of size was defined as: 0= Normal mucosa, 1=lesion size is > 0 up 1.5cm, 2= lesion size is >1.5cm and < 3cm. 3= lesion size is >3cm.

Burning sensation measure was measure according to visual analogue scale it is divided into mild, moderate and severe category. . The symptom formed a very important objective in the follow up. Patient were instructed to drink 20ml wheatgrass juice for a period of 3month twice a day empty stomach in the morning and before meal in the evening, and all the patients free from symptoms after 3months.

Clinical Estimation of the Lesion

Once the study was completed it's very important to assess the effect of the prescribed regime. The response of the patient after the taken of wheatgrass juice was judged with the help of the clinical pictures, the size of the lesion and the burning sensation and intra-incisal distance and tongue protrusion were recorded before and after the therapeutic regime .The pretreatment and post treatment measurements were considered for comparison and sent for statistical analysis for final assessment of the study.

Statistical analysis

Continuous data were summarised as Mean \pm SE (standard error of the mean) whereas discrete

(categorical) in number (n) and percentage (%). Pre and post groups were compared by paired t test. Categorical groups were compared by chi-square (χ^2) test. A two-tailed ($\alpha=2$) $p<0.05$ was considered statistically significant. Analyses were performed on SPSS software (Windows version 17.0).

Results and Observations

The present study evaluates efficacy of green blood therapy (wheat grass) in treatment of oral precancerous lesion. Total 60 patients, 20 leukoplakia, 20 OSMF and 20 lichen planus were recruited. The outcome measures of the study were lesion size and extend (leukoplakia), intra-incisal distance, tongue protrusion and burning sensation (OSMF), and lesion size, extend and burning sensation (lichen planus). The outcome measures were assessed at pretreatment (pre) and 3 month post treatment (post). The outcome measure viz. lesion size was measured in grade (L1, L2, L3 and Lx) and millimetre (mm). The outcome measures viz. lesion size was measured in centimeter (cm), intra-incisal distance and tongue protrusion in millimetre (mm), and burning sensation in visual analogue scale (VAS) (0-10 mm scale).

The objective of study was to evaluate the efficacy of wheat grass juice in improvement of clinical symptoms of Leukoplakia, OSMF and lichen planus patients.

Demographic characteristics

The demographic (age and sex) characteristics of leukoplakia ($n=20$), OSMF ($n=20$) and lichen planus ($n=20$) patients is summarised in table 1 and also depicted in Fig. 1 to 6, respectively. The age of leukoplakia patients ranged from 22 to 45 yrs with mean (\pm SE) 31.15 ± 1.29 yrs and median 32 yrs. Of total, 9 (45.0%) patients were ≤ 30 yrs aged and 11 (55.0%) were

>30 yrs aged. Further, among patients, there were 8 (40.0%) females and 12 (60.0%) males.

Similarly, the age of OSMF patients ranged from 22 to 42 yrs with mean (\pm SE) 30.55 ± 1.29 yrs and median 29 yrs. Of total, 12 (60.0%) patients were ≤ 30 yrs aged and 8 (40.0%) were >30 yrs aged. Further, among patients, there were 7 (35.0%) females and 13 (65.0%) males.

Similarly, the age of lichen planus patients ranged from 23 to 45 yrs with mean (\pm SE) 33.20 ± 1.44 yrs and median 33 yrs. Of total, 7 (35.0%) patients were ≤ 30 yrs aged and 13 (65.0%) were >30 yrs aged. Further, among patients, there were 11 (55.0%) females and 9 (55.0%) males.

Table 1: Demographic characteristics of three groups

Demographic characteristics	No of patients (n=20) (%)
<i>Leukoplakia</i>	
Age:	
≤ 30 yrs	9 (45.0)
>30 yrs	11 (55.0)
Sex:	
Female	8 (40.0)
Male	12 (60.0)
<i>OSMF</i>	
Age:	
≤ 30 yrs	12 (60.0)
>30 yrs	8 (40.0)
Sex:	
Female	7 (35.0)
Male	13 (65.0)
<i>Lichen planus</i>	
Age:	
≤ 30 yrs	7 (35.0)
>30 yrs	13 (65.0)
Sex:	
Female	11 (55.0)
Male	9 (45.0)

Age and sex were summarised in number (n) and percentage (%)

Outcome measures

- A. Leukoplakia
- B. Lesion size

The pre and post lesion size (L1/L2/L3/Lx) of leukoplakia patients is summarised in Table 2 and also

depicted in Fig. 7. At pre, the lesion size of 2 (10.0%) patients was L2, 9 (45.0%) was L3 and 9 (45.0%) was Lx whereas at post, it was 19 (95.0%) L1 and 1 (5.0%) L2.

Comparing the pre and post lesion size (grade), χ^2 test showed significant reduction or improvement in lesion size at post as compared to pre ($\chi^2=37.33$, $p<0.001$) (Table)

Table 2: Pre and post lesion size of leukoplakia patients

Lesion size	Pre (n=20) (%)	Post (n=20) (%)	χ^2 value	p value
Grade:				
L1	0 (0.0)	19 (95.0)	37.33	<0.001
L2	2 (10.0)	1 (5.0)		
L3	9 (45.0)	0 (0.0)		
Lx	9 (45.0)	0 (0.0)		

L1: size if single or multiple leukoplakia together <2 cm,

L2: size if single or multiple leukoplakia together 2-4 cm,

L3: size if single or multiple leukoplakia together >4 cm,

Lx: size not specified. Pre and post lesion size were summarised in number (n) and percentage (%) and compared by χ^2 test.

B. OSMF

I. Intra-incisal distance

The pre and post intra-incisal distance (mm) of OSMF patients is summarised in Table 3 and also shown in Fig. 8. The intra-incisal distance of patients at pre ranged from 15 to 36 mm with mean (\pm SE) 27.20 \pm 1.60 mm and median 28 mm whereas at post it ranged from 18 to 40 mm with mean (\pm SE) 30.40 \pm 1.62 mm and median 31 mm. The intra-incisal distance increased (improved) comparatively at post as compared to pre.

Comparing the pre and post intra-incisal distance, paired t test showed significant increase (improvement) in intra-incisal distance (10.5%) at post as compared to pre (27.20 \pm 1.60 vs. 30.40 \pm 1.62, diff.=3.20 \pm 0.19, 95% CI of diff.=2.81 to 3.59, t=17.17, p<0.001) (Table 3).

Table 3: Pre and post intra-incisal distance (mm) of OSMF patients

Pre (n=20)	Post (n=20)	Difference (Post-Pre)	95% CI of diff.	t value	p value
27.20 \pm 1.60	30.40 \pm 1.62	3.20 \pm 0.19	2.81 to 3.59	17.17	<0.001

(15 to 28)	(18 to 31)	3	3.59		
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Pre and post data were summarised in Mean \pm SE, range (min to max) and median and compared by paired t test. **diff.:** difference.

II. Tongue protrusion

The pre and post tongue protrusion (mm) of OSMF patients is summarised in Table 4 and also shown in Fig. 9. The tongue protrusion of patients at pre ranged from 13 to 28 mm with mean (\pm SE) 19.90 \pm 0.83 mm and median 20 mm whereas at post it ranged from 15 to 31 mm with mean (\pm SE) 22.40 \pm 0.93 mm and median 22 mm. The tongue protrusion increased (improved) comparatively at post as compared to pre.

Comparing the pre and post tongue protrusion, paired t test showed significant increase (improvement) in tongue protrusion (11.2%) at post as compared to pre (19.90 \pm 0.83 vs. 22.40 \pm 0.93, diff.=2.50 \pm 0.17, 95% CI of diff.=2.14 to 2.86, t=14.69, p<0.001) (Table 4)

Table 4: Pre and post tongue protrusion (mm) of OSMF patients

Pre (n=20)	Post (n=20)	Difference (Post-Pre)	95% CI of diff.	t value	p value
19.90 \pm 0.83	22.40 \pm 0.93	2.50 \pm 0.17	2.14 to 2.86	14.69	<0.001
(13 to 28)	(15 to 31)	2			
20	22				

Pre and post data were summarised in Mean \pm SE, range (min to max) and median and compared by paired t test. **diff.:** difference.

III. Burning sensation

The pre and post burning sensation (VAS) of OSMF patients is summarised in Table 5 and also depicted in

Fig. 10. The burning sensation of patients at pre ranged from 0 to 8 with mean (\pm SE) 5.75 ± 0.47 and median 6 mm whereas at post it ranged from 0 to 6 with mean (\pm SE) 2.90 ± 0.47 and median 2. The burning sensation decreased (improved) comparatively at post as compared to pre.

Comparing the pre and post burning sensation, paired t test showed significant decrease (improvement) in burning sensation (49.6%) at post as compared to pre (5.75 ± 0.47 vs. 2.90 ± 0.47 , $\text{diff.} = 2.85 \pm 0.30$, 95% CI of $\text{diff.} = 2.22$ to 3.48 , $t = 9.45$, $p < 0.001$) (Table 5).

Table 5: Pre and post burning sensation (VAS) of OSMF patients

Pre (n=20)	Post (n=20)	Difference (Post-Pre)	95% CI of diff.	t value	p value
5.75 ± 0.47 (0 to 8) 6	2.90 ± 0.47 (0 to 6) 2	-2.85 ± 0.30 (-6 to 0) -2	2.22 to 3.48	9.45	<0.001

Pre and post data were summarised in Mean \pm SE, range (min to max) and median and compared by paired t test. **diff.:** difference.

C. Lichen planus

I. Lesion size

The pre and post lesion size (mm) of lichen planus patients is summarised in Table 6 and also shown in Fig. 11. The lesion size of patients at pre ranged from 1 to 3 mm with mean (\pm SE) 2.40 ± 0.17 mm and median 3 mm whereas at post it ranged from 0 to 1 mm with mean (\pm SE) 0.55 ± 0.11 mm and median 1 mm. The lesion size decreased (improved) comparatively at post as compared to pre. Comparing the pre and post lesion size, paired t test showed significant reduction (improvement) in lesion size (77.1%) at post as compared to pre (2.40 ± 0.17 vs. 0.55 ± 0.11 , $\text{diff.} = 1.85 \pm 0.08$, 95% CI of $\text{diff.} = 1.68$ to 2.02 , $t = 22.58$, $p < 0.001$) (Table 6).

Table 6: Pre and post lesion size (mm) of lichen planus patients

Pre (n=20)	Post (n=20)	Difference (Post-Pre)	95% CI of diff.	t value	p value
2.40 ± 0.17 (1 to 3) 3	0.55 ± 0.11 (0 to 1) 1	-1.85 ± 0.08 (-2 to -1) -2	1.68 to 2.02	22.58	<0.001

Pre and post data were summarised in Mean \pm SE, range (min to max) and median and compared by paired t test. **diff.:** difference.

III. Burning sensation

The pre and post burning sensation (VAS) of lichen planus patients is summarised in Table 7 and also shown in Fig. 12. The burning sensation of patients at pre ranged from 0 to 8 with mean (\pm SE) 5.70 ± 0.48 and median 6 whereas at post it ranged from 0 to 6 with mean (\pm SE) 1.95 ± 0.33 and median 2. The burning sensation decreased (improved) comparatively at post as compared to pre.

Comparing the pre and post burning sensation, paired t test showed significant decrease (improvement) in burning sensation (65.8%) at post as compared to pre (5.70 ± 0.48 vs. 1.95 ± 0.33 , $\text{diff.} = 3.75 \pm 0.35$, 95% CI of $\text{diff.} = 3.01$ to 4.49 , $t = 10.58$, $p < 0.001$) (Table 7).

Table 7: Pre and post burning sensation (VAS) of lichen planus patients

Pre (n=20)	Post (n=20)	Difference (Post-Pre)	95% CI of diff.	t value	p value
5.70 ± 0.48 (0 to 8) 6	1.95 ± 0.33 (0 to 6) 2	-3.75 ± 0.35 (-6 to 0) -4	3.01 to 4.49	10.58	<0.001

Pre and post data were summarised in Mean \pm SE, range (min to max) and median and compared by paired t test. **diff.:** difference.

Discussion

This study was conducted in Career Post-Graduate Institute of Dental Sciences and hospital in opd of oral medicine and radiology. The total duration of study was approx. 26 months. A total of 60 subjects from 20 to 60 years age group were examined clinically.

This study was done to investigate the potentially malignant lesions in the oral cavity like OSMF, LEUKOPLAKIA, and LICHENPLANUS.

The goal of the study was to evaluate the efficacy of wheat grass juice systemically in treatment of oral potentially malignant lesion. This observations indicates that most of the patients in the study were males in leukoplakia and OSMF in lichen planus female are more common similar to the observations made by Freitas MD, Mehta et al in their study indicating male predilection. The reason why males are more commonly affected as compare to female because in a society it is taboo to smoke and consume tobacco product so more of males are habitual of these habit and therefore more commonly seen in males and more prevalent in males. In our study there was clinical reduction in size of the lesion and symptom (burning sensation) of leukoplakia and lichen planus, there was also improvement in intra incisal distance and burning sensation and tongue protrusion in case of oral submucous fibrosis²⁰.

Not much literature is available on use of wheat grass extract in the form of juice in treatment of potentially malignant disorders. Rimple1, Manoj Kumar Katual1, et – al is also indicates benefit of wheat grass in treatment of oral cancer in his article (2016)² Neethu S. Kumar, Megha Murali et-al conducted a review in 2016 benefits

of green blood therapy of wheat grass in treatment of oral potentially malignant lesion¹

There is no previous study done to compare the efficacy of wheat grass juice in treatment of OSMF, leukoplakia, and lichenplanus. Thus, this affirms the use of wheat grass as a potent antioxidant along with habit counseling for treating oral leukoplakia. Also it is cost effective, easily applicable, good compliance of the patient and without any adverse local or systemic side effects. The scope for research is very wide to evaluate the effect of wheat grass and its various forms and extracts. Further studies can also be carried out to assess the substantivity of it over the oral mucosa

Conclusion

The result of the study were very promising and consumption of wheat grass juice as in alternative medicine showed significant reduction in the size of the lesion and also improvement in clinical feature of OSMF, leukoplakia and lichen planus which were also statistically significant. So we can conclude that wheat grass can be considered as an effective and safe to use and economically reasonable alternative therapy in the treatment of oral potentially malignant lesion and condition.

Although in this study certain limitation / drawbacks still exists which need further clarification, such as small sample size and longer follow-up and re-evaluation.

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