



STUDY OF EFFECTIVENESS OF VIRGIN COCONUT OIL FOR THE MANAGEMENT OF RADIATION INDUCED XEROSTOMIA – AN INTERVENTIONAL STUDY

Dentistry

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ABSTRACT

Background: Oral cancer is one of the most frequently occurring cancers worldwide, leading to death. Xerostomia is one of the most common complications in patients with Head and Neck cancer receiving radiotherapy with or without chemotherapy. **Objectives:** To determine the influence of virgin coconut oil on the Quality of life in patients with radiation-induced xerostomia in terms of clinical status, i.e., difficulty in chewing, swallowing, speaking, burning sensation, mouth opening, Reduction in salivation. **Materials and Methods:** The study population consisted of 30 head and neck cancer diagnosed patients who were in the 6th day of radiotherapy. These subjects were asked to swish with 5ml virgin coconut oil for 1 minute during the entire course of their radiotherapy. **Results:** The results of the present study indicated that virgin coconut oil therapy shown Statistically significant improvement in Burning sensation, salivation, swallowing solid foods, and in chewing but difficulty in opening mouth and in speech did not show statistically significant improvement. **Conclusion:** This study concludes that Virgin Coconut oil offers a feasible, inexpensive, and safe alternative to the currently available, imperfect therapies for xerostomia.

KEYWORDS

Radiation mucositis, Xerostomia, Virgin coconut oil.

INTRODUCTION

Saliva is the physiological fluid found in the oral cavity necessary for the maintenance of oral health.^{1,2} Head & neck cancers, are ranked as the 5th most common cancers worldwide³ are accounting for 23% of all cancers in males and 6% in females in India.^{4,5} Radiation-induced damage to the salivary glands causes quantitative and qualitative changes in Saliva, patients become vulnerable to complications that directly or indirectly affect their Quality of life.⁶

Virgin coconut oil (VCO) is processed from the fresh and mature coconut kernel. The process is used to obtain the oil from a mature kernel from fresh coconut, without using heat or chemicals but using mechanical and natural means. The end product is termed Virgin Coconut Oil or VCO⁷. VCO is a biologically active product with anticancer, antimicrobial, analgesic, antipyretic, and anti-inflammatory properties demonstrated in vivo.⁸⁻¹⁰

MATERIALS AND METHODS

Study Design

The study protocol was approved by the Institutional Ethical Committee (IECC/OMR/DISS/12-18/05) of Narayana Dental College and Hospital and Indian Red Cross Society, Cancer Hospital, Nellore.

Inclusion Criteria

- Patients with oral cancer undergoing radiotherapy.
- Patients who have received external beam radiation at a dose of atleast 10Gy for the head and neck region.
- Patients undergoing radiotherapy for head & neck cancer.

Exclusion Criteria

- Patient with allergy/sensitivity to virgin coconut oil.
- Patients with head and neck cancer but not indicated for radiotherapy

Study Procedure

The study was carried out in thirty oral cancer patients who were undergoing radiotherapy as a part of their treatment. The study was

performed from January 2019 to December 2019, from the in-patient section of the Indian Red Cross Society Cancer Hospital, Nellore. The modified questionnaire (university of Washington version- 4)¹¹ was obtained from the intervention groups about functional conditions of the patients, at the end of every week of the 6-week radiotherapy treatment. The university of Washington questionnaire which was modified and consists of different parameters with scores for burning sensation, speech, Saliva, mouth opening, swallowing, chewing.

Patients were asked to start using the virgin coconut oil from the sixth day after the start of radiotherapy. The patients were asked to swish their mouth with 5ml virgin coconut oil for 1 minute and then swallow it. The patients were asked to use the oil during the entire course of their radiotherapy. All the patients were instructed to refrain from eating, drinking, chewing gums, smoking & oral hygiene procedures for at least one hour prior to appointment. Saliva samples were collected at a standardized time of the day (9.00 am to 11.00 am). Later, patients were instructed to swish the oral cavity four times daily with virgin coconut oil from the 6th day till the end of 6-week radiotherapy. The whole Saliva was collected using the spit method in a calibrated container at the end of each week. Calibrated measuring cups were used to collect the whole Saliva from the patients using the spit method. Log of adverse effects was kept during and after the experiment. Salivary flow rate values were recorded before & after conducting the study. The data obtained were subjected to statistical analysis for comparison of salivary flow rates

Statistical Analysis

The data collected was entered into Microsoft excel spreadsheet and analysed using IBM SPSS statistics (Statistical Package for social science) version 22 (Armonk, NY: IBM Corp). Data was analyzed statistically and the prevalence of age, gender and site was done using Independent sample t test, Chi square test, Fishers exact test respectively. The comparison between pre-treatment and post-treatment salivary flow rates was performed using Independent sample t test.

RESULTS

The study included 30 patients of oral cancer undergoing radiotherapy. All Patients were between the age of 35 – 68 years. The mean age of study participants was - 52.53 years, and the standard deviation is 8.14. Out of 30 patients in the study group, 16 (53.3 %) were males, and 14 (46.7%) were females, and there was marked predilection of oral cancer for males compared to females.

Intragroup Comparison Of Mean Value Scores For Burning Sensation In The Mouth:

The mean and standard deviation at baseline was 1.33 and 0.48, and in the 1st week, 1.43 and 0.63, and in the 6th week, 1.57 and 0.50.9.

The mean difference for the baseline to 6th week was 0.24, and the p-value is 0.040 (<0.05), which is statistically significant is shown in table 1 and 2

Intragroup Comparison Of Mean Value Scores For The Difficulty In Swallowing Solid Foods:

The mean and standard deviation at baseline was 1.77 and 0.68, and in the 1st week 1.90 and 0.61 and in the 6th week 2.60 and 0.50.

The mean difference for the baseline to 6th week was 0.83, and the p-value is 0.000 (<0.05), which is statistically significant is shown in table 1 and 2.

Intragroup Comparison Of Mean Value Scores For Mouth Opening:

The mean and standard deviation at baseline were 1.57 and 0.63 and in the 1st week, 1.77 and 0.63, and in the 6th week 2.77 and 0.63.

The mean difference for the baseline to 6th week was 0.28, and the p-value is 0.060 (<0.05), which is statistically not significant is shown in table 1 and 2.

Intragroup Comparison Of Mean Value Scores For Reduction In Salivation:

The mean and standard deviation at baseline was 1.47 and 0.51, and in the 1st week 1.50 and 0.51, and in the 6th week, 1.73 and 0.52.

The mean difference for the baseline to 6th week was 0.26, and the p-value is 0.033 (<0.05), which is statistically significant is shown in table 1 and 2.

Intra-group Comparison Of Reduction In Salivation (baseline Vs 1 Week / 6 Week)

In the intervention group, the difference between the 1st week and 6th week, the whole salivary flow rate is 0.522 ± 0.23 . Between the 1st week and 6th week, the mean difference of the salivary flow rates is 0.257, which is statistically significant with a p-value of 0.033 is shown below.

Follow-ups (Baseline Vs)	Reduction in salivation	
	Mean Difference	P-value
1 week	0.03	0.655 NS
6 week	0.26	0.033 S

Intragroup Comparison Of Mean Value Scores For the Difficulty In Speaking

The mean and standard deviation at baseline was 1.43 and 0.57, and in the 1st week 1.47 and 0.57 and in the 6th week 1.60 and 0.50.

The mean difference for the baseline to 6th week was 0.17, and the p-value is 0.166 (<0.05), which is statistically not significant is shown in table 1 and 2.

Intragroup Comparison Of Mean Value Scores For The Difficulty In Chewing Food

The mean and standard deviation at baseline was 1.40 and 0.56, and in the 1st week 1.57 and 0.57 and in the 6th week 1.87 and 0.35.

The mean difference for the baseline to 6th week was 0.47, and the p-value is 0.001 (<0.05), which is statistically significant is shown in table 1 and 2.

Table 1

Follow-Ups	Mean			S.D		
	Base Line	1st Week	6th Week	Base Line	1st Week	6th Week

Burning sensation in the mouth	1.33	1.43	1.57	0.48	0.63	0.50
Difficulty in swallowing Solid food	1.77	1.90	2.60	0.68	0.61	0.50
Mouth Opening	1.57	1.77	2.77	0.63	0.63	0.63
Reduction in Salivation	1.47	1.50	1.73	0.51	0.51	0.52
Difficulty in speaking	1.43	1.47	1.60	0.57	0.57	0.50
Difficulty in Chewing Food	1.40	1.57	1.87	0.56	0.57	0.35

Table 2

Follow Up (Base Line To 6th Week)	Mean Difference	P-Value
Burning Sensation in The Mouth.	0.24	0.040 S
Difficulty in Swallowing Solid Foods.	0.83	0.000 S
Mouth Opening	0.28	0.060 Ns
Reduction in Salivation	0.26	0.033 S
Difficulty in Speaking	0.17	0.166 Ns
Difficulty in Chewing Food	0.47	0.001S

DISCUSSION

Xerostomia is a persistent side effect with a high impact on patients' Quality of life of patients during and after radiotherapy treatment. The decrease in saliva production causes oral soreness, difficulty speaking, chewing, swallowing, and distortion of taste and sleep. As a result of these symptoms, patients suffer physical, psychological, and social consequences.¹²

Coconut oil, a natural food product, has been anecdotally suggested to ameliorate xerostomia symptoms following HNC radiation treatment. The xerostomia relief mechanism from coconut oil is because of the coatability in the mouth, forming a barrier to keep mucosal surfaces moist. Coconut oil is a feasible option which is cheaper and safer for use in managing Xerostomia in irradiated head and neck cancer patients. It is a natural product that offers ease of use and anecdotally has been suggested to facilitate some patients' having Xerostomia.¹³ The phenolic compounds in VCO include protocatechuic, vanillic, caffeic, syringic, ferulic, p-coumaric acids, and catechin. However, ferulic acid and p-coumaric acid are the major phenolics in VCO and have been shown to possess antioxidant, anti-inflammatory, and chemopreventive effects on carcinogenesis.¹⁴

In the present study, the objective assessment method was done by measuring the salivary flow rate. This objective assessment method performed in the present study is by some previous studies.^{15,16}

As the sample size is small, the ability to conclude virgin coconut oil efficacy in the improvement of Xerostomia among head and neck cancer patients is limited in this study. During this study, most of the patients receiving VCO reported a low level of symptoms. However, in keeping with the study's primary aim, we showed a successful assessment of the feasibility of the use of virgin coconut oil as a therapy option in patients suffering from radiation-induced Xerostomia. Furthermore, we have outlined virgin coconut oil use parameters that were found to be effective by study participants.

CONCLUSION

Xerostomia is a pervasive problem following irradiation for head and neck cancer, with wide-ranging effects on patients' overall health and Quality of life. This has demonstrated that there may be a population of head and neck cancer patients who benefit from the use of virgin coconut oil. It has served to outline parameters of virgin coconut oil use that may be of benefit and which could guide further study into the efficacy of virgin coconut oil as a therapy for radiation-induced Xerostomia.

Conflicts Of Interest: There are no conflicts of interest.

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