



## Case Report

# The healing potential of *Draksha-guduchyadi kavala* in radiotherapy induced oral mucositis in non-metastatic squamous cell carcinoma of head and neck: A comparative case study

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## ABSTRACT

Patients undergoing Radiotherapy (RT) for Head and Neck carcinoma often suffer from side effects such as mucositis, xerostomia, pharyngitis, laryngitis and pain which are being managed symptomatically by mouthwashes of soda-salt, chlorhexidine or betadine. Among the side effects, oral mucositis is the most debilitating one. This comparative case study comprises of 4 patients undergoing RT. Here, 2 patients each are randomly allocated into two groups. One group received the existing prophylactic management i.e., Sodium bicarbonate-salt solution mouth wash and the other group received, Draksha-guduchyadi yoga for kavala (gargling). Both the sets of patients were asked to perform gargling, from the first day of radiation to 15 days thereafter. The effectiveness of both mouthwashes was compared for their healing potential on oral mucositis by RTOG grading. The reduction in mucositis was significant in the group which received Ayurvedic mouthwash compared to the other group. This study positively highlights the contribution of Ayurveda in cancer treatment especially in the field of quality of life.

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## 1. Introduction

Squamous cell carcinoma of head and neck (HNSCC) is ranked as the sixth most common cancer worldwide, 8,90,000 new cases and 4,50,000 deaths due to HNSCC are reported in 2018 [1]. Early-stage management of HNSCC involves surgery, followed by Radiotherapy (RT), Chemotherapy (CT) or Concurrent Chemo-Radiotherapy (CCRT) depending on the histopathological findings with an objective of preventing further proliferation of cancer cells. The RT procedure selectively destroys the cancer cells using high energy x-rays. Conventional fractionation consists of daily fractions of 1.8–2 Gy, five treatments per week with two days off on weekends [2]. Most of the HNSCC patients receive radiation between 50 and 70 Gy, with 2 Gy per day fraction. Often during the course, the positive effects of RT are overshadowed by its side effects, which include mucositis, xerostomia, bacterial, fungal, or viral infections

(particularly in neutropenic patients), dental caries, loss of taste, osteoradionecrosis, etc. [3]. At times, patients either drop treatment or skip the treatment cycle, which directly affects the chances of survival and complicates the vicious circle of cancer pathology.

Oral mucositis is an acute inflammatory response that results from tissue damage. More than 80% cases treated with RT with or without chemotherapy have reported oral mucositis which in turn causes pain, odynodysphagia, dysgeusia, and subsequent dehydration and malnutrition [3]. There is no approved treatment or prophylaxis protocol for oral side effects of RT. The currently recommended measures emphasis on oral hygiene, the use of various mouthwashes, local anesthetics such as lidocaine, magnesium-containing antacids, diphenhydramine and sucralfate, sucking ice, growth factors, non-steroidal and steroidal anti-inflammatory agents, etc. [4].

## 2. Case history

Four male patients from rural Varanasi, who were diagnosed with non-metastatic squamous cell carcinoma of the lower alveolus have undergone surgery and are then, registered in the

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**Table 1**  
Treatment schedule.

Time	Ayurvedic management	Allopathic management	Duration
28.10.2019–02.12.2019 (i.e. During the 6 weeks of RT)	<i>Draksha-guduchyadi kashaya yoga for kavala</i> -50 ml	Sodium bicarbonate- salt solution for gargling-50 ml	10 times a day with a gap of 1.5 hours in a day for about 1 month
03.12.2019–23.12.2019 (i.e. 2 weeks after RT)	<i>Draksha-guduchyadi kashaya yoga for kavala</i> -50 ml	Sodium bicarbonate- salt solution for gargling-50 ml	10 times a day with a gap of 1.5 hours in a day for about 1 month

Radiotherapy and Radiation medicine department (RT & RM) for further management. Out of these, two patients were referred to Ayurveda wing for prophylactic management to prevent their oral difficulties such as pain while opening mouth, difficulty in eating and swallowing, occurrence of wounds with reddish colour and burning sensation occurring as a complication of RT. To compare the effect of Ayurvedic management, two similar cases from RT & RM were also selected and followed and recorded their prophylactic management protocol and their effect for oral mucositis.

**2.1. Patient information**

All patients were male (50 to 62 years of age), with poor socio-economic background. Two of them were farmers and other two were running their own stationery shops. They all followed a vegetarian diet. They had strong history of tobacco usage in the form of *paan* (betel quid with tobacco) for about 20 years and smoking cigarette for about 15 years.

On examination, the oral cavity revealed 2 finger mouth openings with intact tongue movements. The general oral hygiene was poor and coating on tongue was also noticed. Surgical scars were healthy and healed. No associated paranesthesia or discharge was noted.

None had any other diseases like TB, diabetes, or hypertension and no one had any family history related to cancer.

**2.2. History of illness**

Three months prior they presented with an ulcero-proliferative growth in the lower alveolus, and all the cases were diagnosed as squamous cell carcinoma of the lower alveolus. Two of them had cancer on right lower alveolus and the remaining had cancer on left lower alveolus. All the four patients had undergone wide local excision (WLE) with Modified Radical Neck Dissection (MRND) from the department of Surgical Oncology. Following these interventions, they were referred to RT & RM for further

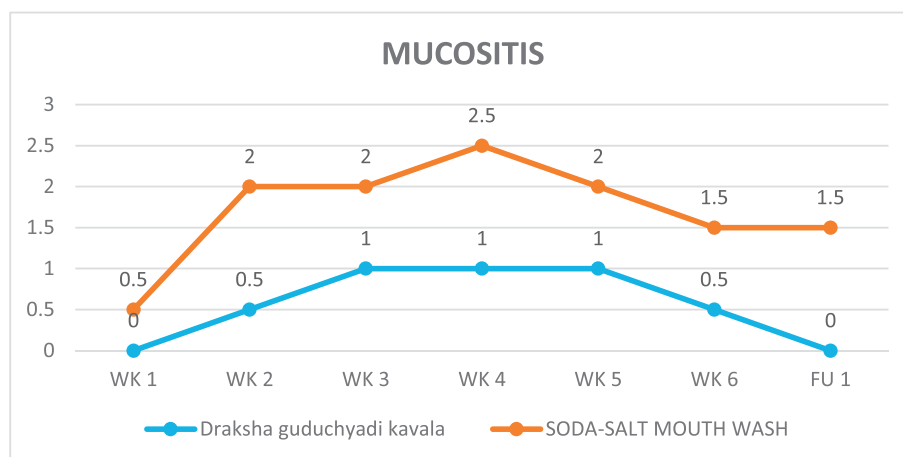
management. All the patients have been prescribed the same dose of external beam radiotherapy with a dose of 60 Gy over 30 fractions in 6 weeks with 2 days off per week. No patient had undergone prior RT or CT.

**3. Clinical findings**

- General examination showed PICCLE (Pallor, Icterus, Cyanosis, Clubbing, Lymphadenopathy, and Edema) to be nil.
- Vital signs were within normal limits.
- All had a healthy wound closure after surgery.
- No patient had any form of non-healing lesion in the oral cavity before the start of RT.
- All the patients are screened for HIV, HBsAg, Anti HCV and HPV. The results were found to be negative for all.

**4. Therapeutic intervention**

Four selected patients, with indistinguishable attributes of morbidity, were randomly placed into two equal groups. One group was given Sodium bicarbonate-salt solution for gargling as per routine protocol of Department of RT & RM to tackle oral mucositis. The other group was given *Draksha-guduchyadi yoga for kavala* (gargling) mentioned in *Mukharoga chikitsa of Ashtangahridaya* [5] in the similar manner under the supervision of physicians from Ayurveda wing. The *kashaya* (decoction) cooled to normal temperature after preparation was used for *kavala*. All the patients were given general instructions regarding diet such as intake of soft and liquid diet with low sugar and acid content and weretold to avoid the use of hot and spicy foods. All of them were also advised to drink a minimum of 2 L water per day by sipping small quantities every half an hour. Instructions regarding oral hygiene were given and they were told to brush the teeth with ultra-soft brush. Multivitamin tablets and protein powder were prescribed to all patients as a routine practice. Other than the medicine for gargle, all other instructions were same in both groups as per



**Graph 1.** Effect on mucositis.

**Table 2**  
Effect on mucositis.

Mucositis	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	F U 1
Drakshaguduchyadi kavala	0	0.5	1	1	1	0.5	0
Soda salt mouth wash	0.5	2	2	2.5	2	1.5	1.5

Multinational Association of Supportive Care in Cancer (MASCC) and the International Society of Oral Oncology (ISOO) guidelines. Here the Ayurvedic intervention in the prophylactic management of mucositis was addressed along with other general guidelines mentioned by MASCC and ISOO guidelines.

The *pitta pradhana tridosha shamana* (*pitta dominant tri-humor alleviation*) property of *Draksha-guduchyadi kavala* was taken into consideration for oral mucositis management. All the four patients started receiving RT on 28.10.2019 which continued till 02.12.2019. Both groups of patients were thoroughly briefed on the preparations and performance of gargling. They started gargling with 50 ml of solution for about 1 min in one sitting, 10 such gargles with a gap of 90 min (1.5 h) had been done in a day. All the patients continued gargling 15 more days post RT i.e., till 23.12.2019. (Details are given in Table 1).

**5. Assessment**

The patients were assessed at baseline, followed by assessment on every Monday for the 6-week radiation schedule and 15 days thereafter. A total of 8 assessments were conducted for each patient during the study. A general understanding about the quality of life of patients, after 15 days of RT were assessed using Hindi translated version of the 'European Organization for Research and Treatment of Cancer for Quality of Life Questionnaire Core 30' (EORTC QLQ-C30) and Head and Neck Cancer Module (QLQ-H&N35).

**6. Results**

**6.1. Effect on mucositis**

The average RTOG (Radiation Therapy Oncology Group) scoring grade of patients in both groups were compared. The Ayurvedic kavala used group showed less severity of mucositis compared to the soda-salt mouthwash group, which is evident in the Graph 1 and Table 2. Week 4 is the peak time of mucositis, where the average grade of mucositis came up to 2.5 in the soda-salt

mouthwash group compared to 1 in the *Ayurvedic kavala* group. Images of all the four patients in the 4th week are given below (Figs. 1 and 2).

**7. Discussion**

Radiation-induced oral mucositis (RIOM) is an acute inflammation of oral mucosa due to the exposure of strong ionizing radiation to oral tissues during RT [6]. The high energy radiation acts as *teekshna agantu nidana* (*strong external cause*) which caused the *bodhaka kapha* vitiation and resulted in *asraya dhathu nasha* i.e. desquamation and basement membrane damage with loss of the protective barrier. This then leads to localized vata and pitta vitiation and results in *mukhantargatha vrana* (mucositis). Doshik appreciation of symptoms can be made like *daha* (burning), *raga* (reddish colouration), *paaka* (inflammation), due to vitiated pitta; *rookshatha*(dryness), *ruja* (pain), *dourbalya* (lack of strength) due to vitiated vata; *gourava*, (heaviness), *anna dwesha*(aversion towards food) due to vitiated kapha. The difficulties associated with *sarva sara mukhapaka* (oral cavity ulcer) may then extend to *oshta* (lips), *jihwa* (tongue), *dantha* (tooth), *danthamoola* (gums), *gala* (neck) etc. It later causes difficulty in opening of mouth. This will badly affect the food intake and thereby causes improper production of *rasa* (first formed body tissue) and the further *dhathus* (body tissues). As a result, the entire body system may get affected and *ojas* (vitality) may get hurtled if left untreated or unattended.

Considering the devastating side effects of RT on the patients, often evident from the deteriorating general health and interruption of the procedure, specific emphasis may be paid to utilize the Ayurvedic kavala with *Draksha-guduchyadi kashaya*, which is powerful enough to reduce the difficulties arising in the *manya* (mandibular region), *sira* (head region), *karna* (ear), *mukha* (oral cavity), *aksi* (eyes) and reduces *praseka* (excessive salivation), *kanthamaya* (diseases of throat), *vaktra sosha* (dryness of mouth), *aruci* (loss of taste) and *pinasa* (a type of rhinitis) [7]. It is worth mentioning that the procedure *kavala*, otherwise also is the best *upakrama* (treatment option) in *mukharoga* (oral diseases) as per classics [8].



Patient 1-on 4th week using soda salt mouth wash

Patient 2-on 4th week using soda salt mouth wash

Fig. 1. Patient 1-on 4th week using soda salt mouth wash. Patient 2-on 4th week using soda salt mouth wash.



Patient 1-on 4<sup>th</sup> week using *Draksha-guduchyadi kavala*

Patient 2- on 4<sup>th</sup> week using *Draksha-guduchyadi kavala*

Fig. 2. Patient 1-on 4th week using *Draksha-guduchyadi kavala*. Patient 2- on 4th week using *Draksha-guduchyadi kavala*.

Out of the 4 types of *kavala*, best one in this condition is *Ropana kavala* (healing type of gargle) [7]. The drugs in the *Draksha-guduchyadi kavala* possess *sita virya* (cold potency) along with *kashaya* (astringent taste), *tiktha* (bitter taste) and *madhura rasa* (sweet taste) which imparts *pitta pradhana tridosa shamana* property which facilitates *ropana* (healing) and *shamana* (palliative) action simultaneously. Understandably, fast wound healing property of the drugs helped in reducing the severity of mucositis. Moreover, each of the drugs of the suggested combination has been successfully tested for its anti-inflammatory, antioxidant, anticancerous and antimicrobial properties [9–15]. In addition to this, the mechanical pressure created during the repeated *kavala* procedure makes a dominant role in the decontamination of oral cavity. This repeated procedure within every 1.5 hours helps to stimulate the salivary glands which reduces the xerostomia and fungal and other microbial contamination by producing more saliva. This repeated procedure was an extrapolation of opinion from *Sarnagadhara Samhitha* [16]. The movement with the solution in the oral cavity enables oral cleansing, and thereby reduces the fungal or other bacterial infections, as usually the patients undergoing RT could not brush properly due to the inability to open the mouth because of the pain and muscle stiffness.

Patients were also able to eat or drink properly as they could open their mouth without difficulty after undergoing *kavala*. There was considerable improvement in the quality of life of patients on account of *Draksha-guduchyadi kavala*. At the same time, the patients who adopted the soda-salt mouth wash showed relatively less progress in reduction of the oral side effects especially mucositis. Moreover, the burning taste of the solution also made it less patients friendly.

## 8. Conclusion

This small comparative case study indicates that the *Draksha-guduchyadi kavala* have potential beneficial effect on reducing mucositis compared to the soda-salt solution. Here the healing action by *kashaya*, *tiktha*, *madhura rasa* with *sita virya* facilitates *pitta pradhana tridosa shamana* property of Ayurvedic formulation with special emphasis on wound healing, oral decontamination, and soothing action along with the procedural benefit of *kavala* together played for alleviation of the oral mucositis. At present, cancer treatment has a multidisciplinary approach. This study will positively highlight the contribution of Ayurveda in cancer treatment with special emphasis in the aspect of quality of life.

## 9. Patient perspective

Patients reported the following after using the Ayurvedic *kavala*. These opinions are based largely on their understanding through

peer interaction and occasional remarks made by their physician before and during the radiation.

1. The difficulty owing to the wounds inside the mouth was not severe (or comparatively less) after the use of Ayurvedic mouthwash. There was no unbearable pain inside the mouth.
2. There was no severe difficulty while eating and they could retain the taste perception.
3. The feeling of dryness inside mouth had been less.
4. There was no considerable difficulty in opening and closing mouth after the treatment. These actions could be done almost without any difference compared to their previous state before treatment.

## 10. Patient consent

Written informed consent was obtained from the patients prior to management and participants have consented for publishing the study.

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## Author contributions

**Saniya C K:** Conceptualization, Investigation, Writing- Original draft preparation. **Mangalagowri V Rao:** Visualization, Validation, Writing- Reviewing and Editing. **Sunil Choudhary:** Methodology, Formal Analysis, Resources. **Om Prakash Singh:** Resources, Supervision, Project Administration.

## Declaration of competing interest

None.

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