



Original Research Article

To study the radiation induced oral mucositis in head and neck cancer - A prospective study

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ABSTRACT

Introduction: Patients suffering from Head and Neck Cancers (HNC), when treated with radiotherapy (RT), often experience Oral mucositis (OMS) side effects. OMS can complicate the treatment and worsen the management of HNC. The Radio-oncologist should find a way to minimize the incidence of OMS during the treatment of HNC.

Aim: To study the Radiation-induced OMS in HNC patients and its associated factors.

Materials and Methods: This prospective study was performed from October 2018 to September 2019. Total 80 patients of with HNC, who were treated with RT, were enrolled for the study with informed consent. In the study, 40 patients received RT and 40 received concurrent chemo-Radiotherapy (CCRT).

Results: Amongst 80 patients included in the study, 72.5% were found to be male. Poor oral hygiene was observed in 77.5% of patients in the study. The tongue cancer (35%) and Cancer of Stage IVa (47.5%) were more prevalent in the patients under study. OMS was observed maximum (60%) in 1 to 4 weeks of treatment.

Conclusion: Inflammation response of epithelial mucosa to chemo- radiotherapy cytotoxic effects leads to mucositis, a painful side effect. This study gives proper understanding of Radiation-induced OMS and identifies the predisposing factors for OMS.

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1. Introduction

As per GLOBOCAN 2018, oral cancer is the second most common cancer in India, with 1.2 lakhs of incidence reports and 72,000 deaths annually. Locally advanced HNC are usually treated by surgery and or by radiotherapy (RT). However, standard treatment for oral cancers.^{1,2}

Radiation-induced Oral mucositis (OMS) in-patient with (HNC) serious adverse therapy.³ severe OMS is with breaking feedingtube.^{4,5}

Despite OMS's high occurrence and clinical implications, its risk factors in HNC patients have not been properly established to date.⁶ The occurrence of

mucosal injuries has been documented to be associated with radiation strength and schedule, chemotherapeutic agent dose and schedule. The incidence of OMS is generally high in patients i) who were treated with altered fractionation radiation schedules ii) receiving total dose over 5000 cGy iii) treated with concomitant chemotherapy iv) with a preexisting primary tumor in oral cavity.⁷

Risk factors related to patient's attributes are still vague. Gender, age, alcohol consumption, prior dental ailment, tumor stage, and variation in salivary flow have been recognized as possible risk factors for OMS. However, the data supporting the significance of each of these factors are deficient and irregular.³

Although the grading of OMS seriousness with instruments such as the World Health Organization (WHO)

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or National Cancer Institute– Common Toxicity Criteria (NCI-CTC) scales is being used in some cases, the evaluation of OMS based on patients observation well recorded by documentation is also done in some cases.^{3,8}

2. Aim

To study the radiation-induced oral mucositis in head and neck cancer and its associated risk factors.

3. Materials and Methods

This prospective study conducted in all the 80 patients with histopathologically established squamous cell HNC undergoing either definitive or adjuvant radiation therapy was enrolled for the study from October 2018 to November 2019.

3.1. Inclusion criteria

1. Histopathologically proven squamous cell HNC.
2. Stage 2 to Stage 4A.
3. Male and female of age between 20 to 70 years.
4. No earlier surgery for the disease except for biopsy.
5. Adequate performance status (Karnofsky performance status > 60).
6. No previous computed tomography (CT) or RT for head-and-neck cancer.
7. Hematological, renal, and hepatic function within normal limits.
8. Provides informed consent.

3.2. Exclusion criteria

1. Prior chemotherapy or radiotherapy in the head and neck region.
2. Serious systemic or widely disseminated disease.
3. Uncontrolled comorbid conditions like diabetes, cardiac and chronic kidney ailment.
4. A co-existing double primary malignancy is present.

All the data were gathered about patient attributes, including age, gender, body weight, prior and/or current alcohol use, tumor location, and stage of disease (AJCC Stages II, III or IV). Information was also collected regarding the type of radiation therapy received (standard, hyperfractionation, standard plus hyperfractionation, or accelerated) during the last completed course, the dose (given [cGy], per day and cumulative), and whether the patient undergone chemotherapy. All patients were evaluated for the onset of mucositis; severity of mucositis; appearance of adverse events like dysphagia, nausea, edema, cough, and pain; use of analgesics to alleviate pain; and insertion of a nasogastric tube to maintain nutrition if they had severe swallowing difficulty.

4. Results

In the present study total of 80 patients were enrolled for the study, out of which 58 patients were found to be male (72.5%) whereas 22 patients were female (27.5%) Table 1.

Table 1: Gender distribution of patients

Gender	No. of patients
Male	58
Female	22

The patient's attributes were studied and it was found that 62 patients had poor oral hygiene, 46 patients were smokers and 42 patients were alcoholics.

Amongst all patients, tongue cancer was observed in a maximum of 28 patients, followed by buccal mucosa. Larynx cancer was observed in the least patients, i.e., 14 patients.

Table 2: Distribution of clinical features in Patients

Jlh0	No of Patients	Percentage
Tumor site	Buccal mucosa	27.5%
	Tongue	35.0%
	Larynx	17.5%
	Gingivobuccal Sulcus	20.0%
Stage	Stage 2	15.0%
	Stage 3	37.5%
	Stage 4A	47.5%
ECOG Performance Status	0	28.8%
	1	41.3%
	2	30.0%
	3	2.5%
Chemotherapy Cycles	4	15.0%
	5	27.5%
	6	5.0%
Radiotherapy duration in weeks	7	47.5%
	8	42.5%
	9	10.0%

The patients with Stage IVA cancer were maximum (38 patients) followed by stage 3 (30 patients) and least in stage 2 (12 patients).

ECOG performance of status shown 30% of patients in status 2, 41.25% in status 1 and 28.75% in status 0. Half of the patients in the study have gone through CCRT whereas rest half (i.e. 40 patients) have taken radical RT. The maximum patients (22 patients) were undergone 5 cycles of chemotherapy, followed by 12 patients with 4 cycles.

epicts that maximum patients have gone through 7 weeks of RT (38 patients) followed by 8 weeks with 34 patients and at least 9 weeks RT in 8 patients. Upon evaluation of onset of mucositis in patients, maximum patients exhibited OMS

during 1 to 4 weeks of treatment (48 patients), followed by more than 4 weeks in 14 patients. It was also found that there was no OMS observed within 1 week of treatment (Table 3).

Table 3: Observation of mucositis in patients

The onset of mucositis in weeks	No. of Patients
<1	0
1-4	48
>4	14

5. Discussion

Almost all the HNC patients receiving RT develop some degree of mucositis. OMS is associated with very high discomfort and the inability of the patients to eat food. OMS also breaks in the treatment process, increase the chances of feeding tube application and hospitalization time.

In our prospective study involving 80 patients, the male patients (72.5%) were found significantly higher than the female. It might be due to more numbers of male patients were registered for the study.

Patients with poor oral hygiene were found to be associated with OMS as it was found in 62 patients, followed by smoking and alcoholism. These findings are in accordance with previous studies done by Barber⁹ et al. 2007. Although, as per our study, oral hygiene is one of the factors associated with OMS, little evidence found that it could reduce the onset and severity of OMS. In recent times, the medical community has not yet formed any standardized medical nutrition program for the treatment of radiation-induced OMS.

In our study, a prior history of smoking (46 patients) and alcohol (42 patients) consumption have direct association with OMS incidence, which coincide with earlier study done by Elting et al.¹⁰

In the present study, the risk of OMS was found to be directly related to the stage of HNC. Patients with tongue cancer and cancer stage IVA were at higher risk of OMS as per our study findings. These observations in our study were in accordance with earlier studies published in literature.^{11,12}

Patients with 5 cycles of chemotherapy and 7 weeks of radiotherapy showed maximum OMS incidences. This is as per an earlier study done by Lalla¹³ et al. 2014. The chemotherapy cycles showed direct relation with the increased risk of OMS. It might be due to the serious damaging effect of chemotherapy on oral mucosal tissues.⁴

The more number of OMS incidence was observed during 1 to 4 weeks of the treatment. These findings were as per the study carried out by Elting et al. 2008, where 80% of patients showed OMS severity in 3 weeks of treatment.¹⁴ However, in our study, 14 patients (17.5%) did not show any

incidence of OMS throughout the treatment.

In our study, there are few limitations like single institutional study, non-randomized and prior existence of malignancy. The study population heterogeneity was also an important drawback. Despite these limitations, we believe the present prospective study confirms that OMS is a common complication among HNC patients and is often associated with adverse clinical outcomes such as breaks/delays in treatment and hospitalization.

6. Conclusion

In the form of radiotherapy for head and neck cancer treatment, oral mucositis remains an oncologic challenge. It is a dose-limiting toxicity of chemotherapy and radiation treatment that has a detrimental effect on the quality of life and the effectiveness of cancer treatment. This study aids in the identification of contributing factors and provides a thorough understanding of all factors.

7. Conflict of Interest

No conflict of Interest.

8. Source of Funding

None.

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