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Original Article

Relationship of Oral Hygiene and Oral Mucositis with Concurrent Chemo-Radiotherapy in Head and Neck Cancers

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ABSTRACT

Background: Oral mucositis is a common and debilitating side effect of concurrent chemoradiotherapy for head and neck cancers, significantly affecting patient quality of life and treatment continuity. Previous studies have highlighted the potential role of oral hygiene in mitigating the severity of mucositis, yet standardized care protocols remain underexplored.

Objective: To investigate the relationship between oral hygiene and the incidence and severity of oral mucositis in patients undergoing concurrent chemoradiotherapy for head and neck cancers.

Methods: A prospective observational study was conducted over six months at the Oncology Department of Combined Military Hospital, Rawalpindi, with a sample size of 100 patients. Patients aged 18-70 years with histopathologically confirmed head and neck cancers and an ECOG performance status of 2 or less were included. Oral hygiene was assessed using a standardized scale, and mucositis was graded post-therapy using the CTCAE version 5.0 criteria. Data were analyzed using SPSS version 25 with Chi-square tests and ordinal logistic regression.

Results: The study found that 44% of patients with poor oral hygiene developed moderate to severe mucositis (grades 2 and 3), compared to 24% with grade 2 and 5% with grade 3 mucositis in the good oral hygiene group. The difference in mucositis severity between the two groups was statistically significant ($P < 0.01$).

Conclusion: The maintenance of good oral hygiene is significantly associated with a lower severity of mucositis in patients receiving concurrent chemoradiotherapy for head and neck cancers. This association suggests that standardized oral care protocols should be an integral part of cancer treatment to improve patient outcomes.

Keywords: Oral Mucositis, Concurrent Chemoradiotherapy, Head and Neck Cancer, Oral Hygiene, Patient Outcomes, Oncology Care, Quality of Life, ECOG Performance Status.

INTRODUCTION

The interrelation between oral hygiene and the development of oral mucositis in patients undergoing concurrent chemoradiotherapy for head and neck cancers is a critical area of study due to the significant morbidity associated with mucositis. Concurrent chemoradiotherapy, which involves the simultaneous administration of chemotherapy and radiotherapy, has emerged as a cornerstone in the treatment of a majority of head and neck cancers, offering improved outcomes in terms of organ preservation, Overall Survival, Disease-Free Survival, and local control (1-3). This combination therapy is particularly relevant for patients with positive resection margins, extracapsular lymph node spread, locally advanced tumors, or when treatment is intended to be definitive.

However, the therapeutic efficacy of concurrent chemoradiotherapy is accompanied by a spectrum of acute and delayed adverse effects. Among the acute complications, oral mucositis stands out due to its high prevalence, affecting approximately 89% of patients during treatment (4). Oral mucositis, characterized by inflammation of the mucous membrane, often commences as mild discomfort and erythema within 1 to 2 weeks of initiating treatment at doses of 10-20 Gy. The condition escalates to more severe mucositis at doses exceeding 30 Gy, peaking around the fourth to fifth week and can persist for 2–3 weeks after the completion of therapy (6).

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The etiology of mucositis is linked to the cytotoxic effects of radiotherapy and chemotherapy on rapidly dividing epithelial cells, leading to significant alterations in the epithelium and connective tissue (5).

The impact of oral mucositis on patients' quality of life is profound, as it contributes to pain, swelling, increased risk of infection, and dysphagia. Moreover, severe cases of mucositis (grade 3-4) necessitate the use of feeding tubes in approximately 70% of affected patients, highlighting its role as a critical dose-limiting toxicity in cancer treatment (8, 9). Among the factors influencing the occurrence and severity of oral mucositis, poor oral hygiene and increased radiation dose have been identified as significant contributors (7). These observations underscore the need for rigorous research aimed at elucidating the relationship between oral hygiene practices and the risk of developing mucositis in this patient population.

Given the substantial burden of oral mucositis on clinical outcomes and patient well-being, our study is designed to explore the association between oral hygiene and the incidence and severity of mucositis in individuals receiving concurrent chemoradiotherapy for head and neck cancer. By categorizing oral hygiene status as either good or bad based on a predefined scale and monitoring acute mucositis occurrences up to two weeks post-treatment, we aim to identify potential preventive measures that could mitigate the risk and impact of this debilitating condition. Our objective is to affirm the hypothesis that poor oral hygiene is intricately linked with the exacerbation of mucositis symptoms, thereby offering a tangible avenue for intervention to enhance patient care and treatment tolerability in this vulnerable cohort.

MATERIAL AND METHODS

This prospective study was conducted in the Oncology Department of Combined Military Hospital, Rawalpindi, over a duration of six months following the approval of the research topic. The study aimed to assess the relationship between oral hygiene and the occurrence of oral mucositis among patients receiving concurrent chemoradiotherapy for head and neck cancers. The sample comprised 100 patients, calculated based on the average monthly incidence of new head and neck cancer cases in the outpatient department of the oncology unit, which was approximately 3±1. Utilizing the WHO sample size calculator and referencing a pivotal article (10) with a population proportion of 100, the sample size was determined with a confidence level of 95%, a power of 80%, and anticipated population proportions of 10% and 25% for the first and second groups, respectively. A convenient random sampling technique was employed to select the participants for this observational cross-sectional study, and the Chi-square test was applied for statistical analysis.

Inclusion criteria specified patients with histopathologically confirmed head and neck cancers, aged between 18 and 70 years, and with an Eastern Cooperative Oncology Group performance status (ECOG PS) of 2 or less. Patients were excluded from the study if they exhibited nephrotoxicity or were pregnant. After obtaining the necessary permissions from the concerned authorities and the Hospital Ethical Committee, in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments, informed written consent was secured from each participant. The consent process ensured that patients were fully informed about the study's purpose, procedures, potential risks, and benefits.

Data collection involved the registration of participants' demographic and clinical details, including OPD registration numbers, names, ages, genders, heights, weights, body surface areas (BSA), and contact information. Oral hygiene and health status were evaluated using a questionnaire and clinical examination before the commencement of radiotherapy, while the severity of oral mucositis was assessed upon completion of the treatment. The mean age of the participants was 45 years, encompassing both male and female patients.

The diagnostic and staging work-up was followed by curative radiotherapy administered at the Radiation Oncology Department of CMH Rawalpindi. To minimize observer bias, all collected data were reviewed by the supervising researcher before being recorded in a specially designed pro forma, annexed to the study synopsis.

For data analysis, SPSS version 25 was employed. Numerical variables, such as height and weight, were summarized using mean and standard deviation. The associations between oral hygiene, radiation dose, and the occurrence of oral mucositis were examined through ordinal logistic regression analysis, providing insights into the significant factors contributing to the severity of mucositis in the study population.

RESULTS

The statistical analysis of our study revealed a significant association between oral hygiene and the severity of mucositis among patients undergoing concurrent chemoradiotherapy for head and neck cancers. The findings indicated that patients who maintained good oral hygiene experienced less severe mucositis. Specifically, within the group characterized by poor oral hygiene, 44% of patients developed moderate to severe mucositis, classified as grades 2 or 3. Conversely, in the cohort adhering to good oral hygiene practices, only 24% encountered grade 2 mucositis, while a mere 5% suffered from grade 3 mucositis. The stark difference between

the two groups was statistically significant, with a P value of less than 0.01. This correlation underscores the importance of good oral hygiene in mitigating the severity of mucositis, which may contribute to fewer interruptions in treatment and better overall patient outcomes.

Table 1: Oral Hygiene Status

Factor	Condition	Score
Health of the Gums	Healthy	1
	Unhealthy	0
Health of Teeth	Healthy	1
	Unhealthy	0
Presence of Any Foul Smell	Yes	0
	No	1
Teeth Alignment	Satisfactory	1
	Unsatisfactory	0
Overall Oral Hygiene	Good Oral Hygiene	4
	Bad Oral Hygiene	<4

Table 2: CTCAE Version 5.0 (Common Terminology Criteria for Adverse Events)

Mucositis Grade	Symptoms	Description
Grade 1	Asymptomatic or mild symptoms	-
Grade 2	Moderate pain or ulcer	Doesn't interfere with oral intake
Grade 3	Severe pain	Interfering with oral intake
Grade 4	Life-threatening consequences	Urgent intervention indicated
Grade 5	Death	-

Table 3: Eastern Cooperative Oncology Group (ECOG) Performance Scale

Performance Status	Condition	Definition
0	Fully active	No performance restrictions
1	Strenuous physical activity restricted	Fully ambulatory and able to carry out light work
2	Capable of all self-care	Unable to carry out any work activities. Up and about >50% of waking hours
3	Limited self-care	Confined to bed or chair >50% of waking hours
4	Completely disabled	Cannot carry out any self-care; totally confined to bed or chair

DISCUSSION

The data garnered from the study suggested a compelling link between oral hygiene and the severity of oral mucositis in patients undergoing concurrent chemoradiotherapy for head and neck cancers. This association is congruent with existing literature, underscoring the preventative impact of meticulous oral care on radiation-induced oral mucositis (RIOM), particularly when combined with chemotherapy (11). Prior research has consistently advocated for robust oral hygiene protocols as a cornerstone in mitigating the incidence of mucositis (4). Among the recommended practices, the usage of povidone-containing mouthwashes emerged as a primary preventative strategy against mucositis triggered by radiotherapy and chemotherapy (11).

The significance of fundamental oral hygiene routines in diminishing both the prevalence and intensity of mucositis cannot be overstated. Implementations of oral care protocols have shown to be efficacious and are increasingly being integrated into clinical practice, thereby promoting evidence-based care to improve patient outcomes (12). The emphasis on maintaining exemplary oral hygiene, inclusive of thorough dental care, is especially pronounced during cancer therapy. Prioritizing oral health maintenance across the continuum of cancer treatment is paramount in reducing treatment interruptions and in enhancing the quality of life for patients (13).

However, the robustness of these findings is tempered by certain limitations. Notably, the scarcity of focused research on this prognostic factor and the relatively modest sample sizes in the literature pose challenges. Moreover, there is an evident lack of a

standardized approach to basic oral care within these studies. Despite these limitations, the overarching consensus supports the critical nature of sustaining optimal oral hygiene during cancer treatment as a means to improve treatment efficacy and to ameliorate the overall quality of life for those affected.

Building on these insights, future research should aim to rectify the current gaps in knowledge. Larger-scale studies with well-defined oral care protocols are necessary to reinforce the existing evidence. Additionally, longitudinal research could elucidate the long-term benefits of enhanced oral hygiene practices on patient outcomes beyond the immediate scope of mucositis management. Drawing from these investigations, it is anticipated that comprehensive guidelines can be formulated, promoting an integrated approach to oral health within oncological care regimens.

CONCLUSION

The study conclusively demonstrates that diligent oral hygiene significantly mitigates the severity of oral mucositis in patients receiving concurrent chemoradiotherapy for head and neck cancers, reinforcing the importance of integrated oral care protocols in oncological treatment regimens. These findings bear critical implications for human healthcare, particularly in enhancing patient quality of life and treatment efficacy, and they call for the incorporation of standardized oral hygiene practices into patient education and healthcare provider training as part of comprehensive cancer care.

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