

Original Research Article

ORAL DISCOMFORT IN PATIENTS WITH CANCER DURING CHEMOTHERAPY - A PILOT STUDY FROM COASTAL ANDHRA PRADESH

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ABSTRACT

Background: During chemotherapy, patients with cancer face a range of oral risk factors that can impact their oral health. Chemotherapy can lead to a weakened immune system, making patients more susceptible to oral infections and complications. Common oral issues during chemotherapy include mucositis, xerostomia (dry mouth), and taste changes. These oral complications can significantly affect a patient's quality of life and may require specific dental care and management. **Objective:** To identify the oral manifestations like oral mucositis, dry mouth and loss of taste in patients undergoing chemotherapy treatment.

Materials and Methods: In our study, we assessed 72 patients who were undergoing chemotherapy treatment for malignancy. We collected various clinical and pathological data including age, gender, diagnosis of malignancy, and the types of anticancer chemotherapeutic drug treatments administered. The presence and severity of oral mucositis were evaluated using the Common Terminology Criteria for Adverse Events (CTCAE) v5.0 scale, which is a standard method for grading adverse effects. Additionally, we recorded other related findings such as dry mouth and loss of taste.

Results: Of the 72 patients, 46 (63.9%) were male, and 26 (36.1%) females with a mean age of 52.8 years. Most patients about 63% and 83% were diagnosed with dry mouth and loss of taste, respectively and 71% of patients had mucositis. Chemotherapy drugs like Cyclophosphamide, carboplatin, nanoxel, paclitaxel, oxaliplatin, docetaxel and doxorubicin, were directly associated with oral mucositis.

Conclusion: Patients undergoing chemotherapy for cancer frequently experience a variety of severe and incapacitating oral dysfunctions. These may include mucositis, xerostomia, and taste disturbances. It is essential for healthcare professionals to address these adverse effects and provide appropriate symptomatic treatment to patients. Despite its significant impact on oral health, chemotherapy's effects are typically temporary. Therefore, close monitoring and management of oral health are crucial for healthcare providers.

Keywords: Cancer, chemotherapy, mucositis, xerostomia, oral discomfort.

INTRODUCTION

During chemotherapy, patients with cancer face a range of oral risk factors that can impact their oral health. Chemotherapy can lead to a weakened immune system, making patients more susceptible to oral infections and complications. Common oral issues during chemotherapy include mucositis, xerostomia (dry mouth), and taste changes. These

oral complications can significantly affect a patient's quality of life and may require specific dental care and management. Dry mouth often occurs as a side effect of medication or as a result of a condition directly affecting the salivary glands, leading to reduced saliva production.^[1] Mucositis, a type of mucosal injury affecting all compartments rather than just the epithelium, has a complex pathophysiology and is influenced by factors such as

age, gender, time of diagnosis, medical history, and certain medications. There is limited understanding of oral symptoms in individuals with advanced cancer, with up to 86% of cancer patients experiencing taste changes. These taste changes can significantly impact the quality of life of cancer patients, causing increased distress, reduced appetite, and contributing to poor nutritional status.^[2] This particular study aimed to identify the specific characteristics of oral symptoms in a population of cancer patients. Not all patients who undergo cancer chemotherapy are at equal risk for developing oral complications. A number of variables have been identified that bear on both the frequency and severity of oral problems associated with therapy.

MATERIAL AND METHODS

An observational study was conducted at Government General Hospital Machilipatnam, prospectively evaluating a continuous sample of patients with advanced cancer in the period of December 2023 to February 2024. The study design was approved by the institutional ethical committee.

Inclusion Criteria: Encompassed patients with various stages of cancer undergoing chemotherapy, who were willing to participate in the study.

Exclusion Criteria: Involved thrombocytopenia worsening the patient's condition, severe allergy to platinum salts, uncontrolled comorbidities (pulmonary, kidney, liver, or heart failure), and patients under 18 years of age.

Demographic data, type and duration of cancer, frequency of chemotherapy, and medical history were collected through a questionnaire. Patients were categorized into two groups that is male and female. [Table 1] Additionally, information about disease presence, oral mucositis symptoms, regular medications, eating/hydration limitations was obtained. Data were recorded using a Microsoft Excel spreadsheet at the time of admission, including care visits, medical records, age, sex, weight, height, chemotherapy purpose, clinical stage, and chemotherapy protocol. Mucositis toxicity scores were assessed using the Common Terminology Criteria for Adverse Events (CTCAE) v5.0 scale, categorizing mucositis into five grades based on severity^[3]. Clinical examination was used to assess the presence of mucositis, dry mouth, and loss of taste, employing tools such as a mouth mirror, sterile cotton, and required instruments for sialometry.

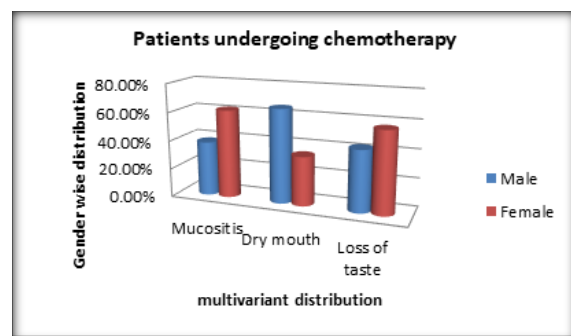
Patients' oral cavities were examined daily using a suitable light source. All oral mucosal sites were thoroughly assessed, including the posterior aspects and buccal vestibules, by having the patients move their tongue and retract the buccal mucosa. The production of unstimulated saliva was measured through sialometry, assessing the rates of salivary production under specific collection conditions.

Statistics The data were exported to IBM SPSS Statistics for Windows, Version 21.0 for statistical

analysis and to obtain 95% confidence intervals. The prevalence of oral mucositis, loss of taste, and dry mouth was represented as absolute frequency and percentage compared to the risk variables.

RESULTS

The study involved a total of 72 patients, ranging in age from 30 to 75, with a mean age of 52.80 years. Of the patients, 63.9% were men and 36.1% were women. Of the total, 76.4% (n=55) of the patients experienced oral mucositis, with 34 female and 21 male patients affected. Additionally, 89% of the patients reported experiencing dry mouth, with 19 female and 31 male patients affected. Furthermore, 78% of the patients experienced taste loss (Table-1, Graph-1). Oral mucositis was more prevalent in patients who underwent adjuvant chemotherapy and those who received three or more medications as part of their chemotherapy regimen. The occurrence of oral mucositis was directly associated with chemotherapy medications such as cyclophosphamide, carboplatin, nanoxel, paclitaxel, oxaliplatin, docetaxel, and doxorubicin. Conversely, medications like abiraterone acetate, tramab, rituximab, methotrexate, zoledronic acid, vincristine, ifosfamide, capecitabine, and temozolamide were inversely associated with oral mucositis.



Graph 1: Represents the Multivariate distribution in male and female cancer patients.

Dry mouth was seen in patients receiving chemotherapy drugs like cyclophosphamide, carboplatin, etoposide, paclitaxel, oxaliplatin, docetaxel and doxorubicin, followed by, 5 fluorouracil, vinblastine, ifosfamide, beomycin, vincristine and irinotecan. Loss of taste was seen in the patients receiving chemotherapy drugs like Adriamycin, cyclophosphamide, bortezomib, lenalidomide, carboplatin, etoposide, nanoxel, paclitaxel docetaxel, oxaliplatin, calcium leucovorin, 5 fluorouracil leucovorin, doxorubicin, vincristine, ifosfamide, bleomycin vinblastine, dacarbazine, gemcitabine, cisplatin, irinotecan, methotrexate rituximab and zoledronic acid [Table 2].

Patients undergoing chemotherapy treatment with drugs such as cyclophosphamide, carboplatin,

etoposide, paclitaxel, oxaliplatin, docetaxel, and doxorubicin frequently experience xerostomia. Furthermore, xerostomia is also commonly seen in patients receiving 5-fluorouracil, vinblastine, ifosfamide, bleomycin, vincristine, and irinotecan as part of their chemotherapy regimen. Impairment in taste sensation is a recognized adverse effect in patients receiving chemotherapy with medications like Adriamycin, cyclophosphamide, bortezomib, and lenalidomide. The clinical features of the tumor play a significant role in the development of oral mucositis.

Patients with malignancies of the stomach, lungs, gastrointestinal system, ovary, pancreas, breast, and esophagus are directly associated with oral

mucositis. Conversely, there is an inverse correlation between oral mucositis and bone cancers, neuroendocrine tumors, gestational trophoblastic neoplasia, multiple myeloma, and prostate cancers. Moreover, it is important to highlight that a significant number of individuals diagnosed with tumors in various organs such as the lung, gastrointestinal system, pancreas, stomach, ovary, bone, gall bladder, urinary bladder, breast, and invasive urothelial carcinoma are susceptible to taste disturbances. Additionally, the study reveals that a large proportion of patients suffering from dry mouth have also exhibited symptoms of mucositis. [Table 2]

Table 1: Multivariate analysis of patients undergoing chemotherapy

Study Population (n=72)	Mucositis 76.4 % (n=55)	Dry mouth (n=64) 89%	Loss of taste (n=56) 78%
Male	38.2%	65.6%	42.9%
Female	61.8%	34.4%	57.1%

Table 2: Influence of chemotherapy drugs on the oral symptoms

Chemotherapy Drugs	Mucositis		Dry Mouth		Loss of taste	
	Yes	No	Yes	No	Yes	No
Cyclophosphamide (n=11)	6	5	9	2	10	1
Bortezomib (n=5)	2	3	1	4	3	2
Lenalidomide (n=5)	1	4	2	3	2	3
Zoledronic Acid (n=5)	1	4	0	5	2	3
Carboplatin (n=19)	17	2	15	4	19	0
Nanoxel (n=7)	6	1	1	6	6	1
Paclitaxel (n=12)	12	0	12	0	12	0
Docetaxel (n=6)	5	1	5	1	6	0
Oxaliplatin (n=10)	9	1	9	10	1	0
5-Fluorouracil (n=17)	16	1	17	0	17	0
Leucovorin (n=16)	15	1	16	0	16	0
Doxorubicin (n=4)	4	0	4	0	4	0
Gemcitabine (n=6)	6	0	2	4	6	0
Cisplatin (n=3)	2	1	2	1	3	0
Zoledronic Acid (n=5)	2	3	1	4	2	2

DISCUSSION

Chemotherapy is a method of treatment for cancer that utilizes medications with cytotoxic properties to reduce or eliminate neoplastic cells. It's important to note that chemotherapy drugs not only target tumor cells, but can also negatively affect normal structures such as the oral mucosa.^[4] The drugs can impact the buccal mucosa directly through circulation or indirectly via the secretion of chemotherapeutic chemicals in saliva. The effects of these medications seem to be linked to a decrease in the capacity for mitosis in the buccal mucosa epithelium. Exposure of the oral mucosa to chemotherapy drugs is associated with the development of conditions like mucositis, xerostomia, and gingival bleeding.^[5] The severity of mucositis can vary based on factors such as the type of cancer, the specific chemotherapy modality, the number of chemotherapy cycles, and the intervals between each cycle. A pilot study was conducted to evaluate the oral symptoms in a population of cancer patients undergoing chemotherapy.

Mucositis, dry mouth, and loss of taste are very common among cancer patients, with prevalences of 76.4%, 89%, and 78% respectively. These symptoms can have a negative impact on the healing process and severely restrict the intake of meals and liquids. Many cancer therapies, especially those involving mucotoxic chemotherapeutic drugs, are associated with a highly feared and potentially debilitating condition known as mucositis. Sixty-three percent of the patients in the study reported experiencing altered taste, which aligns with findings from other investigations.^[1]

Our research revealed that individuals undergoing chemotherapy treatment with drugs such as cyclophosphamide, carboplatin, etoposide, paclitaxel, oxaliplatin, docetaxel, and doxorubicin exhibited a higher likelihood of developing xerostomia compared to those treated with 5-fluorouracil, vinblastine, ifosfamide, beomycin, vincristine, and irinotecan, consistent with the conclusions drawn by Campos et al.^[5] It is apparent that the medications utilized in anticancer treatment have the potential to result in xerostomia, while scholarly discourse continues regarding the precise

drugs causally associated with this adverse reaction.^[6,7] In our investigation, we noted a clear correlation between oral mucositis and malignancies of the lung, ovary, breast, and liver, aligning with the assertion made in another study that the site of the primary tumor may impact the probability of oral mucositis.

Chemotherapy drugs like cyclophosphamide, carboplatin, nanoxel, paclitaxel, oxaliplatin, docetaxel, and doxorubicin have been found to have a significant impact on the prevalence of oral mucositis. Similarly, cisplatin, 5 fluorouracil, leucovorin, and gemcitabine have also been observed to influence the occurrence of oral mucositis.^[9] A study conducted in Austria in 2010 and in Brazil in 2022 assessed the incidence of oral mucositis in solid tumors, revealing the involvement of primary chemotherapeutic agents such as cyclophosphamide, docetaxel, doxorubicin, and cisplatin. There is limited research comparing the prevalence of mucositis among patients with similar illnesses but varying ages. However, it has been noted that compared to adult patients undergoing the same cancer treatment, younger patients may experience a higher incidence of mucositis.^[8]

The level of oral hygiene practiced during therapy significantly influences the outcome of oral infections and challenges.^[9] Both the patient and their healthcare professionals' ability to minimize oral flora have a positive impact on local and systemic illnesses.^[9] Aggressive oral hygiene treatments can effectively reduce oral flora. Factors such as the type of therapy, administration schedule, total drug or radiation dose, and concurrent therapy can increase the risk of oral problems. Certain databases provide information on the frequency of stomatotoxicity caused by medication and agent.^[10]

The role of the dental surgeon in the multidisciplinary team of cancer treatment is vital for diagnosing, treating, and preventing chemotherapy-related pathologies. Additionally, the dental surgeon contributes to the construction of more reliable data regarding the association of lesions with the treatment. Understanding these challenges can significantly impact the quality of life and help reduce the negative consequences of chemotherapy. A study by Kiyomi et al. and our own study have both indicated a correlation between oral dryness and oral mucositis, as a majority of individuals with oral dryness also exhibit oral mucositis symptoms.^[11,12]

Oral symptoms like mucositis, dry mouth, and altered taste require the same level of care as infections and mucosal damage. Failing to identify and address oral dysfunction can impact a patient's ability to tolerate and adhere to cancer therapy, and may also contribute to depression and other psychological issues. Healthcare professionals in oncology should regularly assess and monitor the severity and impact of oral dysfunction in clinical practice. Dentists have a crucial role in helping

patients manage impaired oral function. Therefore, it is important to prioritize comprehensive oral care for cancer patients undergoing chemotherapy.

CONCLUSION

Patients undergoing chemotherapy and radiotherapy for cancer often experience a range of severe oral dysfunctions, particularly in relation to oral mucositis. The most commonly reported issues accompanying oral mucositis are dry mouth and distorted taste. Specifically, patients undergoing chemotherapy cycles with drugs such as cyclophosphamide, carboplatin, cisplatin, paclitaxel, oxaliplatin, docetaxel, leucovorin, 5-fluorouracil, doxorubicin, gemcitabine, and bevacizumab are at a heightened risk. While chemotherapy can significantly impact oral symptoms, the effects are typically temporary. It is crucial for healthcare providers to inform patients about these potential side effects and ensure they receive appropriate symptomatic treatment.

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