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The Influence of Chemotherapy on the Oral Cavity Condition in Oncological Patients - a literature review

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Abstract

Introduction and Purpose:

Chemotherapy remains one of the primary and fundamental methods of cancer treatment. It affects not only malignant cells but also the healthy tissues of the body. The side effects of oncological therapy within the oral cavity are a common and significant clinical issue, often compromising patients' quality of life and, in some cases, hindering the continuation of treatment.

The aim of this article is to review the most recent scientific literature from the past five years regarding chemotherapy- related oral symptoms in oncology patients, and to highlight the complexity of their clinical management, emphasizing the importance of a multidisciplinary approach involving specialists across various fields.

Description of the State of Knowledge:
Chemotherapy can induce numerous oral complications, including mucositis, ulcerations, oral pain, xerostomia, and trismus. In severe cases, some of these complications may necessitate discontinuation of cancer therapy. Xerostomia and oral microbiome alterations increase the risk of dental caries, candidiasis, and other infections. These symptoms can significantly affect the overall condition and well-being of oncology patients.
Conclusions:
Given the frequency and severity of oral complications, awareness, early recognition, and appropriate preventive and therapeutic interventions are essential. Disseminating knowledge on this subject among healthcare professionals of all specialties is crucial to ensuring comprehensive, interdisciplinary care for oncology patients.

Keywords: chemotherapy; oral manifestations; oral cavity mucosa; oncology; side effects; oral complications

1. Introduction

Chemotherapy remains one of the primary and fundamental methods of cancer treatment [1, 2] affecting not only malignant cells but also healthy tissues of the body [3]. Adverse effects of oncological therapy within the oral cavity- observed not only in patients with head and neck cancers but also in those with malignancies in other regions [4] - represent a common and clinically significant issue [2], which can substantially impair patients' quality of life and, in some cases, may even lead to discontinuation of treatment.

A thorough understanding of the systemic effects of chemotherapy is essential for implementing effective therapeutic strategies [3], which often require and interdisciplinary approach involving collaboration between various medical professionals, including dental practitioners [5]. Since prevention is more effective than managing complications [6], expanding knowledge about the oral side effects of chemotherapy is a key component in improving the quality of care and patient comfort during an already challenging cancer treatment.

The aim of this article is to review the most recent scientific reports from the past five years regarding chemotherapy- induced symptoms in the oral cavity and to emphasize the importance of an interdisciplinary approach in the care of this patient group. The complexity of oncological patients' health problems necessitates close cooperation among specialists from multiple disciplines, including dentists, to ensure comprehensive and effective treatment.

2. Research materials and methods

A literature review was conducted using the Pubmed and Google Scholar databases to identify literature related to oncologic treatment. We have been focusing on articles mentioning that treating patients with chemotherapy caused some side effects in the oral cavity. The databases mentioned above have been searched through separately using the search terms applied line by line, and consistently repeated across all sources to ensure uniformity. The search strategy involved the use of the following terms: „chemotherapy and oral cavity symptoms" paired with terms including: „side effects", „oral cavity mucosa", „oral manifestations", „oral complications".

Our inclusion criteria focused on papers published from year 2020 onward ensuring that they constituted over 75% of the selected literature. A summary of information available in scientific articles and studies posted in medical information databases was made.

3. Discussion

The reviewed literature describes a range of characteristic changes occurring in the oral cavity of oncology patients undergoing chemotherapy. This form of treatment significantly impacts the condition of the oral mucosa and associated structures, such as the salivary glands [7].

When addressing complications of anticancer therapy within the oral cavity, mucositis should be discussed first, as it is one of the most common adverse effects observed in this area [6-16]. Mucositis is defined as a toxic inflammatory response of the mucosa, leading to erythema, ulceration [16], edema, and pseudo membrane formation. This inflammatory process is frequently accompanied by burning mouth syndrome (BMS), which can progress into severe, chronic pain. Such discomfort may hinder eating and communication, ultimately resulting in weight loss, dehydration, and hospitalization [16]. In extreme cases, the patient's physical deterioration may force clinicians to interrupt oncologic treatment [6, 8, 9]. Even though oral mucositis remains a major challenge for oncology patients, recent studies offer promising insights into new methods of its management [17, 18].

Among other oral complications associated with chemotherapy are stomatitis, viral infections, gingival bleeding and gingivitis, periodontitis, as well as trismus- characterized by restricted mouth opening [4, 6, 7, 14-16].

Another burdensome symptom is xerostomia- the sensation of dry mouth resulting from insufficient or absent salivary secretion. This condition may result from destruction of the glandular parenchyma [4, 6-8, 15, 16]. Additionally, salivary thickening and altered pH levels can further contribute to oral dryness [8]. Xerostomia is a serious, chronic condition that typically worsens with each week of treatment, often peaking around the sixth week. It can cause oral dryness, BMS, and superficial changes in the tongue, palate, and labial folds, leading to difficulties with denture use. In severe cases, xerostomia may result in speech, swallowing, and chewing difficulties, as well as generalised pain in the oral cavity and pharynx [4, 6-8, 16]. Furthermore, it may trigger a cascade of secondary conditions, including an increased risk of dental caries [7, 19], oral candidiasis [6, 7], and halitosis [7].

Dysgeusia, or altered taste perception, is another significant complication. It likely arises from damage caused by therapy to the oral epithelium, taste buds, and nerves, leading to appetite loss, reduced intake of calories and nutrients, and eventually malnutrition [4, 8, 20-23]. A frequently reported manifestation is metallic taste, which, due to its chronic nature, significantly impairs patients' quality of life. Although most often linked to radiotherapy, it has also been observed in individuals undergoing radiochemotherapy [20, 22]. Buiret G. et al. (2025) found no correlation between oral candidiasis, salivary flow or reduced taste intensity and metallic taste. However, they did observe a significant association between metallic taste and oral mucositis. Despite being an underrecognized issue, taste alterations have a profound impact on the daily functioning of oncology patients.

The article by Wang Y. et al., dedicated to the impact of chemotherapy on the oral cavity in pediatric patients, demonstrated that all participants were at increased risk of dental caries, oral mucositis, gingivitis, oral candidiasis, xerostomia, and alterations in the oral microbiota-changes, which predispose to numerous opportunistic infections [19]. Another study by Ambati P. et al., focusing on adolescent patients, revealed that chemotherapy- related symptoms vary over time. Initially, oral mucositis is most prominent, but as treatment progresses, dental caries becomes the primary long-term complication in oncology patients. The authors emphasized the importance of implementing oral health prevention strategies to avoid painful complications of cancer therapy [24].

An interesting correlation was also observed between two studies- one involving pediatric patients and the other focusing on women with breast cancer. Despite the different populations, both studies reported similar oral health issues, including a higher plaque index, gingival index, and increased caries risk [16, 24].

Gómez-Espinosa, E. et al. highlighted in their article that oral cavity complications are often overlooked and untreated due to a lack of awareness or diagnostic challenges. This underscores the urgent need to enhance healthcare providers' understanding of the oral side effects of chemotherapy, further validating the purpose of the present study [16]. Dental care is frequently misperceived as a separate aspect of treatment, whereas its integration into oncologic therapy offers substantial benefits- primarily to the patient.

4. Conclusions

Articles published over the past five years continue to report numerous adverse effects of chemotherapy, and the latest scientific findings still highlight the insufficient awareness within the medical community regarding oral complications resulting from oncological treatment. Chemotherapy triggers a cascade of detrimental changes in the oral cavity, and ignoring, underestimating, or overlooking oral cavity complications of chemotherapy should no longer be acceptable in clinical practice. The symptoms described in this paper are not limited to temporary discomfort or burning sensations- they often represent serious pathological conditions that may lead to systemic deterioration, negatively affect the patient's mental health, and, in extreme cases, make further cancer treatment impossible. For this reason, education and comprehensive, interdisciplinary dental care- before, during, and after oncological therapy- are essential and should become a global standard of care.

Disclosure

Supplementary Materials

Not applicable.

Author Contributions:

Conceptualization, Kinga Popielarska; Methodology: Paula Marcinkowska, Michal Jezierski; Software: Klaudia Martyna Patrzykąt, Marta Krzyżaniak; Check: Ewelina Nowicka, Kamila Wróblewska; Formal analysis: Izabela Brynczka, Zofia Gorzoch-Burduk; Investigation: Julia Puzio, Paula Marcinkowska, Ewelina Nowicka; Resources: Zofia Gorzoch-Burduk, Michal Jezierski; Data curation: Izabela Brynczka, Kamila Wróblewska; Writing-rough preparation: Kinga Popielarska, Marta Krzyżaniak; Writing-review and editing: Klaudia Martyna Patrzykąt, Julia Puzio; Supervision: Kinga Popielarska; All authors have read and agreed with the published version of the manuscript.

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Conflicts of Interest

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