

The Influence of Initial Dental Status on the Development of Mucositis in Oncohematological Patients Receiving Chemotherapy

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Abstract This paper presents the results of a clinical study of the dental status of patients with oncohematological diseases undergoing chemotherapeutic treatment. Examination of 156 patients suffering from diffuse large B-cell lymphoma and acute myeloblastic leukemia, showed a high level of dental morbidity before the start of chemotherapy. An analysis of the relationship between the initial dental indicators and the severity of mucositis developing against the background of chemotherapy was carried out. It was found that the presence of destroyed teeth, metal structures and a high index of oral hygiene significantly increase the risk of developing severe forms of mucositis. Dental risk groups were identified, which is of practical importance for the development of preventive measures and increasing the effectiveness of complex treatment of cancer patients. The results of the study emphasize the need for mandatory oral sanitation before the start of chemotherapy.

Keywords Oncohematological diseases, Chemotherapy, Dental status, Mucositis, KPU index, Oral hygiene, Dental risk, Prevention

1. Introduction

According to the World Health Organization (WHO), more than 19 million new cases of cancer are registered annually in the world, of which about 10 million are fatal. [1-3] In the structure of malignant neoplasms, a special place is occupied by hemoblastoses - malignant lesions of the hematopoietic and lymphatic systems, among which the most common are diffuse large B-cell lymphoma and acute myeloblastic leukemia. [6] With the development of oncohematology and the widespread introduction of chemotherapy into clinical practice, the duration and quality of life of patients has increased significantly. [5] However, side effects accompanying chemotherapeutic treatment, including those from the oral cavity, remain an urgent clinical, medical and social problem. [2]

As noted by S.A. Borisenko (2014), "oral complications during chemotherapy can significantly reduce the quality of life of cancer patients, contribute to secondary infection and often require suspension of the main antitumor treatment." These patients especially often develop mucositis - inflammation of the oral mucosa, the severity of which depends on both the chemotherapy regimen and the initial

dental condition of the patient. [3]

According to E.M. Kuzmina (2009), "the initial dental status of the patient has a direct impact on the risk of development and severity of mucositis during antitumor treatment", which requires mandatory dental examination and sanitation before the start of chemotherapy. [4] However, in practice, the preparation of cancer patients for treatment in the dental aspect is often ignored or carried out formally. [5]

In the Republic of Uzbekistan, issues of dental support for oncohematological patients are not sufficiently covered in scientific literature, and standardized protocols for the prevention and treatment of complications in the oral cavity during chemotherapy are only beginning to be implemented. [6] As clinical practice shows, most patients are admitted for treatment without preliminary sanitation of the oral cavity, with a high prevalence of caries, periodontal diseases and the presence of destroyed teeth and metal orthopedic structures.

Taking into account the above, the relevance of this study is due to the need for a comprehensive assessment of the dental condition of oncohematological patients, identifying the relationship between the initial dental indicators and the severity of mucositis, as well as substantiating approaches to the formation of dental risk groups. [7] This will not only improve the quality of medical care, but also ensure a multidisciplinary approach to the management of this category of patients.

This study was conducted at the Department of Dentistry of the Bukhara State Medical Institute in collaboration with

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Received: Mar. 3, 2025; Accepted: Mar. 27, 2025; Published: Apr. 6, 2025

Published online at <http://journal.sapub.org/ajmms>

the Bukhara Regional Oncology Dispensary and covers the period from 2014 to 2022. The study analyzed dental indicators in 156 patients with oncohematological diseases at various stages of chemotherapy. The data obtained formed the basis for a differentiated approach to the prevention and treatment of mucositis, and also made it possible to identify high dental risk groups.

Objective of the study. The objective of this study is a comprehensive assessment of the dental status in patients with oncohematological diseases (in particular, with diffuse large B-cell lymphoma and acute myeloid leukemia) receiving chemotherapy, as well as determining the relationship between baseline dental parameters and the severity of mucositis. In addition, the objective is to identify dental risk groups in order to develop effective preventive measures and optimize dental care for these patients.

2. Material and Method of the Study

This study was conducted at the Department of Dentistry of the Bukhara State Medical Institute. The study sample included 156 patients receiving chemotherapy for hemoblastoses, such as diffuse large B-cell lymphoma and acute myeloid leukemia. The sample included 156 cancer patients at stages I - IV who received chemotherapy from 2014 to 2022 at the Bukhara Regional Oncology Dispensary of the Ministry of Health of the Republic of Uzbekistan.

3. Results of the Study

The level of dental condition in patients with oncological diseases was assessed during the initial examination using standard dental indices in accordance with established methods.

To assess the severity of mucositis in patients, the CTCAE v.4.03 toxicity scale (Common Terminology Criteria for Adverse Events), which was released by the National Cancer Institute in 2010. The severity of mucositis was determined as part of systematic dental examinations before and after each course of chemotherapy.

Table 1. Severity of mucositis in patients before chemotherapy treatment

| 1 Group | 2 Group | 3 Group | 4 Group |
|----------|-----------|-----------|-----------|
| 1.01±0.4 | 1.43±0.36 | 1.64±0.12 | 1.29±0.26 |

As shown in Table 2, all indicators in all groups are practically indistinguishable from each other. $p < 0.005$

After comparing the results with the evaluation criteria presented in Chapter 2 of this study, the following conclusions were obtained:

- The level of caries intensity in all groups has extremely high values, fluctuating from 13.86 to 14.63.
- The prevalence and intensity of periodontal diseases according to the CPITN index in all groups corresponds to the indicator of the need for professional oral hygiene

and individual oral hygiene training, being in the range from 2.19 to 2.53.

- The degree of inflammatory diseases in the gum tissues on average corresponds to moderate gingivitis, affecting 40% to 45% of patients.
- The level of individual oral hygiene corresponds to unsatisfactory indicators, with a score from 1.82 to 2.12.

Table 2. Results of the assessment of the initial dental status in all groups

| Dentistical index | Indicators indices | | | |
|-----------------------------------|--------------------|------------|------------|------------|
| | 1 (n=40) | 2 (n=39) | 3 (n=38) | 4 (n=38) |
| CPU | 13.86±0.68 | 12.9±0.72 | 14.63±1.09 | 13.8±83 |
| CPITN | 2.19±0.73 | 1.91±0.64 | 2.53±0.61 | 2.30±0.62 |
| GreenV | 2.08±0.28 | 2.01±0.21 | 1.82±1.18 | 2.12±0.27 |
| PMA | 45.01±8.29 | 41.21±7.93 | 41.71±4.99 | 44.11±6.74 |
| Availability metalcrowns (%) | 56 | 8.3 | 64.7 | 60.9 |
| Availability destroyedy teeth (%) | 75 | 62 | 70.6 | 78.2 |

The average values of these indices, according to the epidemiological dental survey of the population (Kuzmina E.M., 2009), are as follows: the KPU index in the age group of 35-44 years is from 13.97 to 14.02, and in the age group over 65 years - from 22.58 to 23.15 for the urban and rural population, respectively. The percentage of the presence of dentures and the need for fixed bridges is 41% and 27%, respectively, for the age groups of 35-44 and over 65 years.

When compared with the average indicators, the following results were obtained:

- The level of caries intensity in oncological and oncohematological patients corresponds to the average indicators: 14.15 in oncological patients and 14.02 in somatically healthy patients, the difference is only 0.9%.
- The level of presence of fixed dentures in oncological and oncohematological patients significantly exceeds the average indicators, amounting to 63.3% in oncological patients and only 27% in somatically healthy patients, the difference is 57.3%.

Before the start of antitumor treatment, cancer patients are characterized by high dental morbidity, low levels of individual oral hygiene, and lack of knowledge and skills in oral care (see Table 3 and Figure 1).

Thus, it can be concluded that the level of intensity and prevalence of caries and periodontal diseases in all the studied patients who were admitted for chemotherapy is significantly increased. All these patients need dental sanitation. It is worth noting that at the pre-hospitalization stage, in no case was dental sanitation of the oral cavity performed before the start of chemotherapy.

Table 3. Data anamnesis on cological patients (n=156)

| | Data anamnesis | Average meaning, standard deviation |
|---|---|-------------------------------------|
| 1 | Quantity visits doctor-dentist Vyear | 0.6+-0.01 |
| | | n(%) |
| 2 | Number of patients who underwent preliminary sanitation of the artery before admission Vhospital | 0(0) |
| | Number of patients using additional means individual hygiene mouth (dental thread, rinses, irrigator) | 11(9,1) |



Figure 1. Original state oral cavities at oncological patients

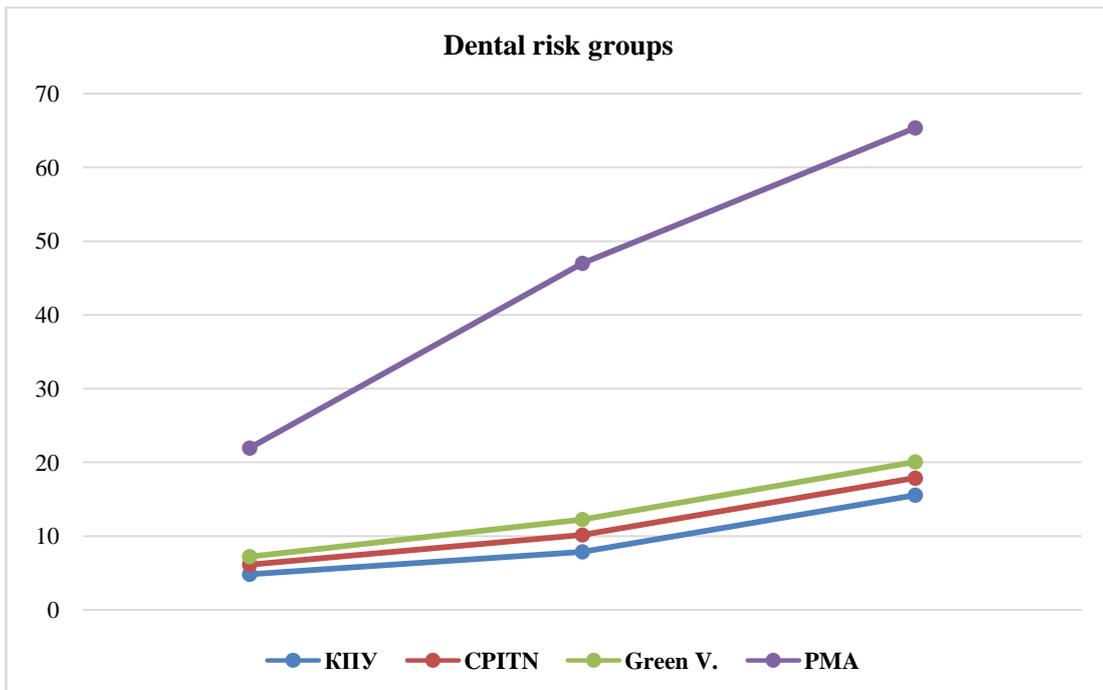


Figure 2. Dental risk groups

Table 4. Relationship between the severity of mucositis and the initial dental status

| Degree gravity mucositis By RTOG. | CPU | CPITN | Green V. | PMA | Availability metal scheskie dental prostheses | Availability destroyed teeth. |
|-----------------------------------|-----------|----------|-----------|-----------|---|-------------------------------|
| 0-1 | 4.83±0.7 | 1.32±0.7 | 2.01±0.21 | 14.72±8.7 | 14.5% | 18.18% |
| 2 | 7.85±0.7 | 2.3±0.68 | 2.07±0.25 | 34.76±8.0 | 12.5% | 18% |
| 3-4 | 15.56±0.6 | 2.31±0.4 | 2.18±0.27 | 45.31±6.7 | 76.9% | 89.2% |

Based on the analysis of data regarding the initial oral health of the patients and the highest grade of mucositis, which was assessed according to the RTOG classification system (see Table 4), we identified the following results, which can be interpreted as different risk groups for the development of mucositis.

From Table 4 and Figure 2 it can be seen that the more pronounced Mucositis develops more often in patients with high KPU index (6-10), high Green V index (1.7-2.5), presence of metal structures in the oral cavity and presence of decayed teeth. These patients can be classified as a high dental risk group for mucositis development.

Patients with KPU values (6-10), Green V index (1.7-2.5), but without metal structures and without destroyed teeth can be classified as a group with an average dental risk of developing mucositis.

The group with a low dental risk of developing mucositis is represented by patients with a KPU index of less than 6, a Green V index of less than 1.7 and the absence of metal structures and destroyed teeth, with a significance level of $p < 0.05$.

4. Conclusions

The conducted study allowed us to establish that the initial dental status of most patients with oncohematological diseases admitted for chemotherapy is characterized by high intensity and prevalence of caries, poor oral hygiene, the presence of decayed teeth and metal orthopedic structures. At the same time, none of the patients underwent preliminary oral sanitation before the start of antitumor treatment.

Analysis of the relationship between the severity of mucositis and initial dental indicators showed that the presence of decayed teeth, a high KPU index, a high hygiene index (Green V), and the presence of metal structures significantly increase the risk of developing severe forms of mucositis. Based on the data obtained, dental risk groups were identified, which is important for predicting complications and planning preventive dental measures.

Thus, the results of the study highlight the need to implement standardized dental examination and oral sanitation before chemotherapy in cancer patients. This will not only reduce the frequency and severity of mucositis, but also increase the effectiveness of the main treatment, improving the overall quality of life of patients.

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