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CASE REPORT

Dentist Role in Increasing Quality of Life in Mucositis Patient with Acute Lymphoblastic Leukemia

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ABSTRACT

Background: *Mucositis, a painful condition common in patients undergoing chemotherapy, can decrease the patient's quality of life. Treatment of mucositis by dentists supports the improvement of general health conditions and the patient's quality of life.* ***Objective:*** *This case report aims to discuss a case of a patient with mucositis after undergoing chemotherapy treatment for acute lymphoblastic leukemia.* ***Case:*** *21 years old female diagnosed with acute lymphoblastic leukemia, referred to the oral medicine department from internal medicine, complained of pain in oral mucosa and lockjaw in the last three days after chemotherapy treatment with methotrexate. Internal medicine prescribes ceftriaxone intravenous (IV), dexamethasone IV, chlorhexidine gargle, and nystatin. Intraoral examination showed erosive lesions in the tongue, labial, and buccal mucosa and was diagnosed as oral mucositis grade 3 according to the World Health Organization scale. Her quality-of-life score is 46 according to The Functional Assessment of Cancer Therapy-General (FACT-G) and 58 according to Oropharyngeal Mucositis Quality of Life (OMQoL).* ***Case management:*** *She was treated with magic mouthwash containing diphenhydramine HCL, sucralfate, and aluminum hydroxide-magnesium hydroxide. Chlorhexidine and nystatin were advised to stop. The patient was instructed to keep her oral hygiene by gargling with sodium chloride and povidone-iodine after eating. Five days after the therapy, her condition improved (grade 1), and there was an increase in the FACT-G and OMQoL scores to 54 and 93.* ***Conclusion:*** *Mucositis can cause pain in the patient. A dentist can help diagnose and provide appropriate treatment to reduce the patient's complaints and improve the patient's quality of life.*

Keywords: *Acute Lymphoblastic Leukemia, Chemotherapy, Mucositis, Quality of Life*

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INTRODUCTION

Acute lymphoblastic leukemia (ALL), a leukocyte malignancy, has more than 6500 incidences every year in America.[1,2] ALL is more common in children (80%) and diagnosed before the age of 20.[2] Chemotherapy is the most common therapy to stop the cancer cell from spreading.[3] One of the adverse effects of chemotherapy is mucositis.[4,5] Mucositis is found in 30 to 40% of chemotherapy patients.[6] Chemotherapy agents, like 5-fluorouracil (5-FU), methotrexate, doxorubicin, paclitaxel, docetaxel, are more commonly causing mucositis.[7]

Chemotherapy drugs target the cells that have quick replication, including healthy cells in the oral mucosa.[3,8] Reactive oxygen species (ROS) and inflammatory cytokines are released in the mucosa, activating NF-B, TNF, IL-6, and IL-1, thereby activating apoptosis.[8] In addition, the loss of epithelial growth factor (keratinocyte growth factor) will interfere with normal epithelial growth.[8] This will lead to mucosal layer damage, resulting in erosion or ulceration lesions.[9,10] Mucositis is often found on the buccal mucosa, labial mucosa, lateral of the tongue, the floor of the mouth, and soft palate, with indistinct borders and sometimes covered by pseudomembranous.[9] Mucositis appears three to seven days after the initiation of chemotherapy and persists for 7 to 14 days.[3,11]

Mucositis can cause pain that makes the patients have difficulty in speaking, eating, drinking, and swallowing.[9,11] This will reduce the patient's quality of life, affect the patient's nutritional status, and increase the risk of secondary infection.[10] In severe mucositis, this condition can lead to the interruption of treatment.[11] Treatment of mucositis generally focuses on reducing symptoms and maintaining oral hygiene to prevent secondary infections.[12] In the treatment of oral mucositis, dentist play an important role and it will eventually leads to a better disease control.[13] This case report discussed mucositis in ALL patients undergoing chemotherapy with methotrexate and the role of dentists in it.

CASE REPORT

A 21-year-old woman was referred to the oral medicine department from the internal medicine department for complaints of oral sores and evaluation of the use of 0.2% chlorhexidine gluconate and nystatin drugs. She was diagnosed with acute lymphoblastic leukemia six months ago and is currently undergoing the twelfth cycle of consolidation chemotherapy. The patient underwent chemotherapy with an OPAL regimen [oncovin (vincristine)], prednisolone, adriamycin (doxorubicin), and L-asparaginase, followed by chemotherapy with methotrexate, vincristine, dexamethasone, leucovorin, cyclophosphamide, daunorubicin, L-asparaginase, cytarabine, and Mercaptorabin (6-MP).

Figure 1. Mucositis at (a) upper mucosa labial, (b) lower mucosa labial, (c) right buccal mucosa, (d) left buccal mucosa, and (f) ventral tongue, with (e) limited mouth opening.

She complained of a burning sensation in her oral cavity that had appeared three days ago, and the patient had already received high-dose methotrexate therapy five days before the complaint appeared. She found it difficult to eat, drink, and open her mouth. The patient admitted that the complaint made it difficult for her to sleep but did not feel any bleeding in her oral cavity. The patient had repeated the same complaint for one month ago. When complaints arose, the patient was given 0.2% chlorhexidine gluconate mouthwash and nystatin, that used routinely four times a day. The patient had not used the two

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drugs for several days because the complaints did not improve.

Intra-oral examination revealed an erosive lesion with a red base, shallow, diffuse border on the ventral tongue, buccal mucosa, and labial mucosa (Figure 1). The patient had difficulty opening her mouth. There was gingival covering half of teeth 38 and 48. Extraoral examination revealed dry and exfoliative lips. Based on the history and examination, the patient was diagnosed with mucositis grade 3 according to the World Health Organization (WHO), trismus, dental operculitis at 38 and 48, and exfoliative cheilitis. She was asked to fill out a questionnaire to assess the quality of life based on The Functional Assessment of Cancer Therapy - General (FACT-G) and Oropharyngeal Mucositis Quality of Life (OMQoL) with FACT-G scores 46 and OMQoL 58.

CASE MANAGEMENT

The drugs currently being used by the patient are chlorhexidine gluconate 0.2%, nystatin, intravenous (IV) ceftriaxone, IV dexamethasone, clinimix, fluoxetine, paracetamol, omeprazole, gabapentin, fluconazole, G-CSF, and KSR. The use of 0.2% chlorhexidine gluconate and nystatin is recommended to stop. Pharmacological management given to the patient is a mixture of diphenhydramine HCL, sucralfate, and aluminum hydroxide-magnesium hydroxide, that was used before meals. After meals, the patient was asked to gargle with sodium chloride (NaCl) and povidone-iodine 30 minutes after gargling with sodium chloride. The patient was also asked to apply a thin layer of Vaseline album to the lips. The non-pharmacological treatment given to the patient is to maintain the hygiene of the oral cavity by gargling after eating and trying to clean the teeth and oral cavity using gauze moistened with NaCl. If possible, the patient is recommended to brush teeth using a toothbrush with a small and soft bristles head with fluoride toothpaste.

Complaints in the patient's oral cavity began to decrease after three days of drugs administration, but she still felt sore on the buccal and labial mucosa. There were drug replacements by the internal medicine department, dexamethasone was stopped, and ceftriaxone and fluconazole were replaced with meropenem and micafungin. Erosion in the oral cavity was reduced. The patient routinely uses medication and cleans her oral cavity. However, the patient could not brush her teeth and could only clean the anterior of the oral cavity due to her limitations in opening her mouth.

Figure 2. Mucositis appears to be reduced after 5 days at (a) upper mucosa labial, (b) lower mucosa labial, (c) right buccal mucosa, (d) left buccal mucosa, and (f) ventral tongue, with hairy tongue at dorsal of the tongue(e)

The patient's condition has improved after five days. Painful complaints in the oral cavity have been significantly reduced. The patient felt more comfortable when eating and was able to open his mouth wider. Intra-oral examination showed the erosion has decreased, but on the dorsum of the tongue, a thin brownish plaque can be seen that can be scraped without leaving an erythematous area accompanied by hyperpapilation (Figure 2). There was a change in the patient's diagnosis to WHO scale 2 mucositis, dental operculitis 38 and 48, and hairy tongue. Patients are still advised to rinse their mouth using povidone-iodine and 0.9% NaCl up to a maximum of two weeks of use. In addition, the patient was asked to keep the oral hygiene and clean the tongue using gauze moistened with NaCl.

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Figure 3. Improvement after one month (a) upper mucosa labial, (b) lower mucosa labial, (c) right buccal mucosa, (d) left buccal mucosa, (e)dorsal of the tongue, and (f) ventral tongue.

In the following month, the patient did not experience any pain in his oral cavity. There were no more erosions, and the patient's dorsal tongue condition had improved (Figure 3). She was asked to answer the FACT-G and OMQoL again to see if there was a change in her quality of life. The results showed an increase in the FACT-G value to 54 and the OMQoL value to 93. This shows an increase in the quality of life of patients before and after treatment. Improving the quality of life of patients indicates the success of treatment.

DISCUSSION

Mucositis is a side effect of chemotherapy, and patients with hematological malignancies are more likely to experience complications in the oral cavity than other types of cancer.[14] Leukemic patients tend to experience mucositis during the consolidation phase of chemotherapy.[10] Women are also more prone to mucositis than men.[14] Several chemotherapy drugs can cause damage to the oral mucosa, including methotrexate, vincristine, and daunorubicin.[15] Vincristine has been associated with ulceration, whereas methotrexate is a chemotherapeutic drug secreted in saliva, and it will increase its toxicity in the oral cavity.[4,14] This condition is similar to our patient's condition, a female patient diagnosed with acute lymphoblastic leukemia with mucositis since consolidation therapy with vincristine and methotrexate. Mucositis in our patient was found on the ventral tongue, buccal and labial mucosa, and this is still following the study, which stated that the prevalence of mucositis in acute leukemia was on the ventral tongue, followed by the buccal mucosa.[16]

The patient had been using 0.2% chlorhexidine gluconate and nystatin for approximately four weeks. Using both at the same time can interfere with the effectiveness of each drug.[17] We recommended stopping chlorhexidine gluconate, although it can be used to maintain oral hygiene in patients with mucositis if brushing teeth is challenging to do.[12] We recommend it because chlorhexidine gluconate is only recommended for short-term use and is considered ineffective in reducing the severity of mucositis.[4,18] In addition, using chlorhexidine for four weeks or more can stain the teeth and increase calculus formation if used for more than six months.[19] Nystatin was also recommended to stop because there was no candida infection found in the patient's oral cavity, and the patient was already receiving an antifungal (fluconazole) IV. The use of nystatin also could not reduce the severity of mucositis.[8]

We can give patients with mucositis a magic mouthwash that may contain anesthetics, antacids, diphenhydramine, and steroids, while in this case, we gave the patients a magic mouthwash containing a mixture of diphenhydramine HCL, sucralfate, and aluminum hydroxide-magnesium hydroxide.[6] Sucralfate was given to help reduce the severity of mucositis.[4] NaCl and povidone-iodine for gargling after eating were also instructed to the patient. NaCl is considered more effective than chlorhexidine and has a microbicidal effect due to its high osmolality.[8,9] Thirty minutes after gargling with NaCl, the patient was asked to gargle with povidone-iodine as an antiseptic to reduce the severity of mucositis.[4]

Maintaining oral hygiene is essential in patients with mucositis. There is a relationship between maintaining oral hygiene and the severity of mucositis.[12] Gently brushing, flossing, and using mouthwash can decrease the duration

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and severity of mucositis.[4] Using a toothbrush with soft bristles at least twice a day is also recommended.[20]

Quality of life can be assessed physically, functionally, emotionally, and socially.[11] Oral health is important, not only physically but also enabling a person to interact socially and provide a sense of well-being.[3] Mucositis can reduce the patient's quality of life due to the pain suffered by the patient.[21] We can assess patient quality of life with FACT-G and OMQoL. FACT-G is a multidimensional instrument designed to evaluate the quality of life and pain severity in patients with chronic diseases such as cancer.[22] FACT-G itself is often used to assess patients' quality of life.[23] OMQoL instrument can assess symptomatology, nutrition, social function, and symptomatology for swallowing in patients with mucositis due to cancer therapy.[22] The patient was asked to answer FACT-G and OMQoL before being treated by a dentist, and the results showed FACT-G 46 and OMQoL 58. The FACT-G results were lower than the Jordanian study, with an average result of about 62.[24] After one month, the patient was asked to answer both of the instruments again. There was an increase in the FACT-G value to 54 and the OMQoL value to 93, which showed an improvement in the patient's quality of life. Improvement of the patient's quality of life can occur with treatment in the oral cavity.[25] The quality of life related to oral health in patients with mucositis is also lower than in patients without mucositis.[26]

Dentists can play a role in the multidisciplinary care of haemato-oncology patients and play an essential role in the success of cancer treatment.[27] The treatment from dentists on patients before, during, and after chemotherapy is very important.[9] Prior to chemotherapy, a thorough examination of oral health should be performed, and all invasive procedures, such as tooth extraction should be performed at least two weeks before chemotherapy.[9] Dentists should encourage patients to keep their oral hygiene by brushing their teeth using a toothbrush with a small head and soft bristles, using fluoride-containing toothpaste, recommending gargling with mouthwash, not after brushing teeth because it can reduce the benefits of toothpaste, and using dental floss.[28]

CONCLUSION

Dentists have a role in treating cancer patients who will undergo chemotherapy, where one of the side effects of chemotherapy is mucositis. Dentists can help diagnose mucositis, provide appropriate treatment, and give the patient's oral hygiene instructions according to the patient's condition to maintain the cleanliness of their oral cavity better. Maintaining oral hygiene will help the patient prevent secondary infections that worsen their mucositis. Mucositis can cause a burning sensation in the patient's oral cavity, making it difficult to eat and decreasing the quality of life in patients. Treatment of mucositis by dentists can improve the patient's quality of life.

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