



MUCOSITIS TREATMENT USING OZONATED WATER

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ABSTRACT

Mucositis can follow radiotherapy and chemotherapy due to damage of the mucosal cell renewal cycle. The incidence of oral mucositis in pediatric cancer patients is approximately 65%. The high turnover rate of mucosal cells and variability in the immunostimulatory response and resistance is responsible for the increase in the incidence of oral mucositis in children compared to adults. Clinically, it begins with a change in mucosal color and is followed by ulceration. The resulting pain of mucositis affects the patient's quality of life. This case report describes the treatment of mucositis in a 7-year-old patient using ozonated water.

INTRODUCTION

Various treatment approaches for cancer lead to the occurrence of oral mucositis. Drug dose, frequency of application, type of cancer, and level of immunosuppression pressure during bone marrow aspiration are predisposing factors for oral mucositis. Radiotherapy treatment for head and neck cancers, intensive chemotherapy, bone marrow transplantation, leukemia, steroids used in medicine, dehydration, malnutrition, liver and renal failures, increase the risk [1,2,3].

Oral mucositis is characterized by erythema, edema, bleeding, ulceration, and pseudomembrane formation [3]. Moreover, the mucosa becomes inflamed and erythematous. Painful ulcers are observed all over the oral mucosa. The symptoms appear 3–5 days after the start of chemotherapy and peak after 7–14 days. If infection does not occur, the symptoms begin to subside [4,5].

Nowadays, oral mucositis treatment consists of symptomatic relief with providing appropriate nutritional support [3]. Protective oral care protocol should be perceived as supplement, applied only to heal the oral mucositis. One of the most important factors of protections

of oral mucositis is good and ongoing oral health care [6]. In this case report we present the treatment of a 7 year-old child with oral mucositis using ozonated water.

CASE REPORT

During routine oral examination, oral mucositis was found in a 7-year-old male patient receiving LMB 96, methotrexate, adriamycin, vincristine, cyclophosphamide, and prednisolone for Burkitt's lymphoma at the GATA Pediatric Oncology Clinic. Although the patient was instructed regarding maintenance of oral hygiene prior to beginning chemotherapy, the painful mucositis prevented the patient from maintaining oral hygiene or eating well (Figure 1,2). As a result, the patient was weakened and lost weight; his blood values also decreased. The patient failed to respond to routine mucositis treatment; therefore, ozone therapy was attempted as an alternative.

Ozone gas is hazardous when inhaled; therefore, the ozone was added to water for therapy. The patient and the family provided informed consent to treatment. One day after initiating treatment, the patient reported decreased pain, and the gingiva had changed from a purple



color to red. On the third day of therapy, the patient began eating solid food. After 5 days, the inflamed mucosa improved (Figure 3,4). Treatment was continued for 7 days, and the patient began performing the oral hygiene as instructed and eating regularly. The blood values normalized as well.

Figure 1.



Figure 2.



Figure 3.



Figure 4.



DISCUSSION

Oral mucositis is one of the common toxic effects of chemotherapy and depends on the chemotherapeutic dose [7]. The incidence of oral mucositis in pediatric cancer patients is approximately 65% [8,9]. The most important feature of oral mucositis is the accumulation of the oral microflora on the surface of mucositis. Thus, the microflora can easily damage the patient's immunocompromised oral tissues [2,5,10]. The risk of septicemia in neutropenic cancer patients with oral mucositis is four times that in those without oral mucositis [11].

Previous studies have reported that the pathogenesis of oral mucositis may be associated with the interactions between the oral tissue and microorganisms [12]. Increasing the frequency and quality of oral care, thus reducing the microorganism load, can delay the development of oral mucositis. Liquid consumption should be increased and self-maintenance methods should be followed. The patients must be provided with equipment, information, and education according to individual requirements [3]. However, there is no consensus regarding the prophylaxis and treatment of oral mucositis [13].

Chlorhexidine, benzylamine, nystatin, formal saline, salt, soda were tried as antimicrobial agents for treatment of oral mucositis. Chlorhexidine decreased the severity and incidence of mucositis and prevented dental plaque formation, gingivitis, and fungal infection, and thus can be used for oral prophylaxis or treatment [3]. Cryotherapy, low-energy helium-neon laser, or modern radiotherapy approaches such as exception of oral cavity from radiation area are considered in the prevention of oral mucositis [15].

Ozone is a molecule, which has clinic applications in dentistry and medicine because it has antimicrobial [bactericidal, viricidal, fungicidal], anti-inflammatory, biosynthetic [carbohydrate, activator of lipid and protein metabolism], bioenergetic, antihypoxic, analgesic, and hemostatic properties [16,17,18]. Ozone is very effective in

lysing bacteria, fungi, mold, and yeast. Ozone attacks enflamed cells, which have lost their enzyme layer, thus ensuring that the attack is targeted on these cells alone [21]. Cardoso et al. [20] used ozonated water in stress-related gastric ulcer models. They reported a significant decrease in the incidence of type I, II, and III ulcers. Białoszewski et al. [21] have reported that wound healing is faster when ozone is used rather than other disinfectants. It also helps decrease the pain associated with mucositis and enable faster recovery and return of the patient to daily activities. However, there are very few reports of the application of ozonated water in treatment of oral mucositis [14,19]. Herein, we report a case of mucositis in a Burkitt lymphoma patient treated using ozonated water.

It was reported that rinsing the mouth or other body cavities with ozonated water does not have toxic effects. Even swallowing ozone does not have any negative

effects on the gastrointestinal system [19]. Therefore, we believe that ozonated water can be used as an alternative for the existing treatment methods, as was shown in our case. Within 5 days, the patient's pain decreased and healing of oral mucositis was observed, and the patient could consume solid foods. This patient began to follow oral hygiene rules and proper nutrition.

CONCLUSION

Mucositis is a condition that affects quality of life and nutrition in cancer patients. Using a low risk and effective treatment method is very important because it is one of the most common side effect in chemotherapy and radiotherapy applications. Owing to its ease of application and effectiveness, ozonated water can serve as an alternative mucositis treatment.

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