

## Prevention of Oral Mucositis After Chemotherapy

<sup>1</sup>Mrs. Vidhyalakshmi.D, <sup>2</sup>Dr. Jeyalakshmi, <sup>3</sup>Dr. Anuradha Kudrimoti.

<sup>1</sup>Ph.D. Nursing Scholar, Rani Meyyammai College of Nursing, Chidambaram, Tamilnadu..

<sup>2</sup>Ph.D.Nursing, Reader cum HOD of Psychiatric Nursing,

Rani Meyyammai College of Nursing, Chidambaram, Tamilnadu.

<sup>3</sup>M.B.B.S, M.D. Paediatrics, Deepak Hospital, Jalna, Maharashtra.

(Secretary of Vasantrya Naik College of Nursing, Jalna, Maharashtra.)

Corresponding Author: 1. Mrs. Vidhyalakshmi. D

**Abstract:** Abstract Oral Mucositis is characterized by erythema, inflammation, and ulcerations of the mucous membranes in the oral cavity. This common side effect from radiation and chemotherapy can have significant impacts on quality of life, including alterations in immunity, malnutrition, and weight loss. At present, treatment options for this condition are limited. This review highlights the current state of evidence regarding oral mucositis and treatments that may help prevent or reduce its occurrence.

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### I. Introduction

Mucositis is a common complication among patients receiving chemotherapy or radiation therapy, occurring in approximately 40% of this population (Raeesi 2014). It can be especially problematic during treatment of head and neck malignancies, as well as during treatment with concurrent chemotherapies, which include alkylating agents such as cyclophosphamide and various platinum, anti-tumour antibiotics such as bleomycin, adriamycin (doxorubicin) and epirubicin, and antimetabolites such as 5-fluorouracil (5-FU). Uncontrolled Mucositis can profoundly impact quality of life and treatment effectiveness for patients with cancer, as it may lead to dose limitations for cancer therapy. It can cause immense pain, increases the risk of infection and dysphagia, cause difficulty with food and fluid ingestion, affect nutrition and hydration status and lead to weight loss (Keefe 2007, Stubbe 2013, Worthington 2011).

### II. What Is Mucositis (Mouth Sores)?

Mucositis is an inflammatory reaction of the mucous lining of the upper gastrointestinal tract from mouth to stomach (mouth, lips, and throat) and surrounding soft tissues.

- ❖ Stomatitis refers to inflammation in the mouth.
- ❖ Esophagitis refers to inflammation of esophagus.
- ❖ Mucositis refers to all mucous linings.

This response is due to certain chemotherapeutic drugs, biologic response modifiers, radiation therapy, and/or surgery. This reaction may progress to painful ulcers and infection, interfering with eating, talking, taste, chewing or swallowing and often lasting a few days. Mucositis is a self-limiting condition, currently there is no agent available to consistently prevent or treat this condition. The goal is to decrease the severity and duration of Mucositis and to provide relief of discomfort, and prevent or treat infection until recovery.

#### Oral Mucositis after Chemo/Radiation Therapy:

Oral mucositis is one of the most common side effects of cancer treatment (chemotherapy and/or radiotherapy). It is an inflammatory process that affects the mucosa of the oral cavity, giving rise to erythematous areas in combination with ulcers that can reach a large size. The true importance of oral mucositis is the complications it causes – fundamentally intense pain associated to the oral ulcers, and the risk of over infection. This in turn may require reduction or even suspension of the antineoplastic treatment, with the risk of seriously worsening the patient prognosis. This point to the importance of establishing therapeutic tools of use in the prevention and/or treatment of mucositis. The present study offers a literature review of all the articles published over the last 10 years referred to the prevention and/or treatment of oral mucositis associated to chemotherapy. Some common features of mucositis after chemotherapy/radiation therapy as follows.

- ❖ Oral mucositis is caused by destruction of the oral mucosal epithelium and suppression of its growth secondary to antineoplastic treatment in the form of chemotherapeutic drug substances or radiotherapy.
- ❖ The pathogenesis of mucositis is currently based on a model comprising five biological phases, developed by initiation, signaling, signal amplification, ulceration and healing.

- 3 The frequency of mucositis and its severity are fundamentally dependent upon the type, duration and dose of chemotherapy used. In this sense, bone marrow-suppressing (myeloablative) chemotherapy is associated with a mucositis risk of 60-100%, while the combination of chemotherapy and radiotherapy implies a risk of almost 100%.
- 3 The clinical manifestations of Oral Mucositis become visible 4-5 days after the start of chemotherapy, with the detection of erythematous areas in the oral cavity. After 7-10 days ulcers start to develop; these gradually grow in number and size, and tend to merge, forming large ulcerated zones. The ulcers are generally of scant depth, with a necrotic base, and the margins show little inflammatory infiltration. These lesions are very painful, cause swallowing problems, and take about two weeks to heal once chemotherapy has been suspended.

Oral mucositis causes many complications, ranging from speech and swallowing difficulties to intense pain and ulcer over infection, which may lead to systemic infection (bacteremia or fungemia) – posing a threat to patient life and requiring admission to hospital, with the increased economic costs this implies. These complications may require reduction or even suspension of the antineoplastic treatment, with the risk of seriously worsening the patient prognosis. In relation to Oral Mucositis secondary to chemotherapy, many studies have evaluated the efficacy of different interventions designed to prevent and/or treat the disease.

### **Things You Can Do To Manage Oral Problems:**

#### **II. A .Keep Mouth and Lips Moist:**

1. Rinse mouth with water frequently (every 2 hrs while awake & when awake during the night). May add salt or baking soda (1/2 to 1 teaspoon in 8 ounces of water).
2. Use saliva substitute (commercially available) if needed.
3. Apply lip moisturizer often (i.e. Chap Stick).Suck on hard candies.
4. Keep mouth & teeth clean.
5. Use soft-bristle toothbrush (can soften even more by placing brush in very warm water), cotton swabs, mouth swabs (Popsicle stick covered with gauze) to clean teeth after each meal and at bedtime.
6. Clean dentures and/or bridge after eating. Leave out dentures if experiencing any discomfort.
7. Floss gently with unwaxed floss (if platelet counts adequate).
8. May use Water-Pik.

#### **II. |B. Avoid**

1. Mouth washes containing alcohol.
2. Lemon glycerin swabs.

#### **II. C. Treat the Discomfort/Pain.**

1. Use topical or local agents such as Orajel, or Zilactin-B apply generously.
2. Combination mouth wash can be made (ingredients may require prescription).
3. Use equal parts: xylocaine viscous solution, Zovirax (alcohol-free), and Maalox, or Mylanta.
4. Take 2 teaspoons every 2-4 hours as needed (swish around mouth and spit out).May be advised by healthcare provider to swallow if experiencing discomfort while swallowing.

#### **II. D. For Severe Pain:**

1. Oral or intravenous pain medication\* may be required in addition to topical medication. (\* Prescribed by healthcare provider).

#### **II. E. Enhance Healing:**

1. Apply Orabase, Ulcerase, etc. to irritated areas in mouth or on lips.
2. Apply Vitamin E (puncture cap 400IU and squeeze onto swab. Gently place swab on open area(s).
3. Take an antacid 1/2-1 ounce every 3-4 hours as needed to decrease burning sensation.
4. Maintain good nutrition focusing on high protein and high calorie foods which are soft and/or semi liquid (i.e. Scrambled Eggs, Puddings, Blenderized or Pureed foods). May use liquid supplements (i.e Carnation Instant Breakfast, Ensure, Boost, etc.).

#### **II. F. Avoid:**

1. Hot, spicy, coarse or rough textured foods.
2. Very hot or cold beverages and foods.
3. Citric juices or foods containing citric acid (Tomatoes, Oranges, Lemon etc).
4. Alcoholic beverages or tobacco products.
5. Liquid medication containing alcohol (i.e. Some Cough Medicine) if not essential.

## **II. G. When to Contact Doctor or Health Care Provider:**

1. Temperature greater than 100.5<sup>0</sup> F (38<sup>0</sup>C).
2. Sores or ulcers in mouth or on lips that interfere with eating, drinking or sleeping.
3. Pain or any sign of infection (i.e. tongue heavily coated).
4. Symptoms increasing in severity despite above recommendations.

## **II. H. Drugs That May Be Prescribed by Doctor:**

1. To treat or prevent infection the following may be used.
2. Antifungals: Such as nystatin, clotrimizole, fluconazole.
3. Antibacterials: Mouthwash antiseptic, rinses are the basis of the oral decontamination regimen.
4. Chlorhexidine gluconate (Peridex, PerioGard).
5. Brush and floss teeth, and completely rinse toothpaste from mouth, before using rinse.
6. Antivirals: Such as acyclovir (Zovirax) or famciclovir (Famvir).

## **II. I. To Protect Gastrointestinal (GI) Tract from Irritants:**

1. Gastrointestinal Agents: Sucralfate (Carafate), comes in a liquid suspension form, protects the lining of the mouth to the stomach from irritants.
2. Analgesics for pain control.

## **III. Natural Methods of Prevention of Mouth Sores After Chemotherapy**

Liquorice (British English) or Licorice (American English) is the root of *GLYCYRRHIZA GLABRA* from which a sweet flavour can be extracted. The liquorice plant is a herbaceous perennial legume native to southern Europe and parts of Asia, such as India. It is not botanically related to anise, star anise, or fennel, which are sources of similar flavouring compounds.

Karta Purkh Singh Khalsa, a contributor to the American Herbalists Guild's Herbal Education Handbook, is a natural healing specialist with more than 25 years of experience with medicinal herbs. He suggests using a mouthwash made from licorice root. The sweet tasting ingredients in licorice root are "fifty times sweeter than sugar," says Khalsa, so brew a tea with only about a teaspoon of chopped or powdered herb per one cup of water. Rinse for two or three minutes, and then spit out. Whole licorice root can affect the endocrine system according to Khalsa, so he suggests using it limited quantities. DGL (Deglycyrrhizinated Licorice), a type of processed licorice root that has the endocrine constituent removed, is available in wafers. Chew the wafers to heal oral tissues.

### **III. A. Licorice and Cancer**

Licorice root is one of the oldest and most frequently employed botanicals in Chinese medicine. In the United States, licorice products are most often used as flavoring and sweetening agents in food products. Constituents of licorice include triterpenoids, such as glycyrrhizin and its aglycone glycyrrhizic acid, various polyphenols, and polysaccharides. A number of pharmaceutical effects of licorice are known or suspected (anti-inflammatory, antiviral, antiulcer, anticarcinogenesis, and others). Licorice and its derivatives may protect against carcinogen-induced DNA damage and may be suppressive agents as well. Glycyrrhizic acid is an inhibitor of lipoxygenase and cyclooxygenase inhibits protein kinase C, and down regulates the epidermal growth factor receptor. Licorice polyphenols induce apoptosis in cancer cells. These and other activities of licorice are reviewed, and a rationale is suggested for combinations of agents in preventive clinical trials.

### **III. B. Special Mouth Care When Sores Are Present**

Keep mouth and lips hydrated.

### **III. C. Lips**

Use a water- or lanolin-based moisturizer for comfort. Some people have found that vitamin E oil applied on the lips (not in the mouth) can help heal sores on the lips. Do not recommend use of lip balms that contain mineral oil.

### **III. D. Brushing**

Try gentle brushing with salt and baking soda. Mix 1/2 teaspoon of salt and two tablespoons of baking soda in one quart of warm water. If the sores have become crusty, try hydrogen peroxide mixed with an equal amount of water or weak salt water. This will keep the sores from healing, so only use for a day or two. If the toothbrush is uncomfortable or causes bleeding use foam brush covered with gauze that's been soaked in a salt water mix.

### III. F. Rinsing

Salt water rinses make the mouth more alkaline and thus reduces the growth of bacteria. Fluoride rinses and gels work against a buildup of bacteria. A salt water rinse can be made by mixing 1/2 teaspoon of salt with one cup of water.

Sometimes, dried secretions stick to the inside of the mouth. Rinsing with a baking soda solution can remove them. Use one teaspoon of baking soda to one pint of water or use a product such as Alkalol and gently rinse several times a day. Rinsing keeps particles and bacteria from building up and compounding the problem. If sucralfate (Carafate) is prescribed, ask if salt water can be used instead since recent studies indicate they are equally as effective and salt water is less costly. Some people also find Biotène products helpful. They contain no alcohol and so do not hurt when used.

### IV. Conclusion

Chemotherapy nurses have been much respected for their technical, information-giving, and communication skills. Most recently, chemotherapy nurses have been developing assessment and management skills for supporting patients through their chemotherapeutic pathway. This trend will continue as we future-proof chemotherapy services, and using assessment tools and common toxicity criteria is important for consistency. Nurses have a real opportunity to add value to the patient pathway by undertaking this exciting new role, but not before they are deemed competent to do so and never in isolation from the multidisciplinary team.

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