Oral Care Of Patients Undergoing Chemotherapy And Radiotherapy: A Review Of Clinical Approach

V Singh, S Malik

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Abstract

Chemotherapy may be either an alternative to surgery or adjunct to surgery or radiotherapy in the treatment of cancer. Dental surgeons can expect to be called on to care for patients with cancer undergoing chemotherapy or radiotherapy. Dental surgeons should organise and implement preventive and therapeutic strategies in the management of various complications due to chemotherapy and radiotherapy. The diagnosis and treatment of various complications like mucositis, infections and hemorrhage are discussed here. A programme of oral evaluation and care before, during and after chemotherapy and radiotherapy is presented in this article.

INTRODUCTION

Cancer is public health burden in which there is uncontrolled tissue growth which results from an imbalance between cell division and apoptosis.[1] Most adverse affects of chemotherapeutic agents and radiations are caused by either direct toxic effect on specific organ or by damaging to rapidly dividing normal cell population which are as follows according to organs involved[2].

ADVERSE EFFECTS OF CANCER CHEMOTHERAPEUTIC AGENTS

1. Suppression of bone marrow
3. Leukopenia
4. Throbocytopenia
5. Anemia
6. Enhanced susceptibility to infection
7. Increased incidence of secondary malignancy

1. Gastrointestinal disturbances
3. Nausea
4. Vomiting
5. Diarrhoea
6. Mucositis

1. Cutaneous manifestations
3. Erythema
4. Maculopapular eruptions
5. Exfoliative dermatitis
6. Alopecia
7. Hyper pigmentation
8. Photosensitivity

1. Irreversible cardiomyopathy
2. Pulmonary toxicity
3. Hepatotoxicity
4. Renal toxicity
5. Neurotoxic effects like pain, peripheral neuropathies, convulsions
6. Inhibition of spermatogenesis, oogenesis and menstrual cycle
7. Oral manifestations
9. Mucositis
10. Infections (bacterial, viral, fungal)
11. Hemorrhage

12. Xerostomia

PRINCIPLES OF DENTAL MANAGEMENT

It has been reported that the cumulative effects of acute and chronic oral complications in association with chemotherapy and radiotherapy may be severe. Dental management of an oncology patient prior, during and after the cancer therapy has been discussed here.

PREVENTIVE AND THERAPEUTIC CARE PRIOR TO CANCER THERAPY

A pre-treatment oral evaluation is recommended for all cancer patients before the initiation of cancer therapy to -

1. Rule out oral disease that may exacerbate during cancer therapy.
2. Provide a base line for monitoring effects of radiation and chemotherapy.
3. Detect metastasis
4. Minimize oral discomfort during cancer therapy.

All patients with neoplastic conditions who receive chemotherapy should have a thorough oral examination, including clinical and radiographic evaluation.[3] Patient should be instructed and motivated for oral hygiene procedures. The oral cavity should be rendered clean and free from existing sources of irritation and infections[4]. If head and neck radiation and chemotherapy is scheduled, the following recommendations should be considered:

- Any periodontally weak or mutilated tooth should be extracted.
- Abscessed teeth should be extracted or treated endodontically.
- All surgical procedures should be completed at least 10-12 days prior to onset of neutropenia.13
- Additional therapy like restoration of carious teeth with permanent or temporary restorations, replacement of faulty restorations, grinding of rough edges of tooth or restorations, removal or correction of ill fitting partial or complete prosthesis, and removal orthodontic band.
- Dentures should be meticulously cleaned and soaked daily in nystatin to obviate often unsuspected source of fungi.15
- In children mobile primary teeth and those expected to be lost should be extracted. So that adequate time for wound healing before the induction of radiations and chemotherapy.

GUIDELINES FOR TOOTH EXTRACTION IN PATIENTS SCHEDULED TO RECEIVE RADIATIONS OR CHEMOTHERAPY

- Extraction should be performed with minimal trauma at least 2 weeks, ideally 3 weeks, before initiation of radiation therapy.11
- At least 5 days (in maxilla) before initiation of chemotherapy.
- At least 7 days (in mandible) before initiation of chemotherapy.
- Trim bone at wound margins to eliminate sharp edges.
- Primary closure should be done.
- Intra alveolar hemostatic packing agents should be avoided that can serve as a nidus of microbeal growth.
- If the platelets count is less than 50000/mm3 than transfusion is mandatory.
- Delay the extraction if the while blood count is less than 2000/mm3 or absolute neutrophil is less than 1000/mm3. Alternatively prophylatic antibiotics can be used with extractions that are mandatory.
- Patients who will be retaining their teeth and undergoing radiation or chemotherapy must be informed concerning the problems associated with decreased salivary function, increased risk of oral infections including radiation caries, risk of osteoradiation necrosis.

ORAL CARE DURING CHEMOTHERAPY

From the onset of chemotherapy, proper oral hygiene must be emphasized if complications are to be minimized. There are no universally proven and accepted protocols for prevention and management of mucositis to date.[5] Saline/bicarbonates chlorhexidine mouth rinses can be soothing and will aid in removing food debris, diluting mouth acids and toxins[6].

Commercially available mouth washes like hydrogen peroxide can be harmful and should be discontinued.

It has been recommended that conventional tooth brushing two to three times/day should meticulously carried out as the increased risk of infections and increased bleeding in these cases.

Patients who undergo total body irradiation or chemotherapy are susceptible to thrombocytopenia. Gingival bleeding and submucosal hemorrhage can occur when platelet count is less than 5000 cells/mm^3. To control gingival bleeding, local measures, such as pressure with a gelatin sponge with thrombin or microfibrillar collagen placed over the area or an oral antifibrinolytic rinse placed in a soft vinyl mouth guard can be used to control bleeding. If local measures fail medical help should be obtained and platelet transfusion considered.

The dental surgeon should be familiar with the patients WBC count and platelet status before dental care of patients undergoing radiations or chemotherapy. In general, routine dental procedures can be performed if the granulocyte count is greater than 50000/mm^3.

If urgent care needed and the platelet count is below 50000/mm^3, consultation with the patient's oncologist is required. Blood transfusion, platelet replacement may be indicated if invasive or traumatic dental procedure are to be performed. The protocol of dental management and particularly invasive procedure should only be carried out after three to seven days after fresh blood or blood cells transfusion. If granulocyte count is less than 2000 cells/mm^3, antibiotic prophylaxis and consultation with the physician is recommended.

- Patients should be encouraged to drink plenty of water and other fluids with the exception of diversities such as coffee or tea.
- During and following radiotherpay, the teeth may become hypersensitive which could be related to the decreased secretion of saliva and lowered pH of secreted saliva. The topical application of a floride gel should be of benefit in reducing these symptoms.
- Radiation therapy of the head and neck can cancer damage to the vasculature of muscles and thus trismus of masticatory muscles and joint capsule. To minimize the effect of radiation in the muscles around the face and muscles of mastications, a mouth block should be placed during external beam radiation. The patient also should perform daily stretching exercises at least 3-4 times daily1.
- Dentures wearing should be avoided during the first 6 months after completion of the radiotherapy.
- Implants can be placed one to one and a half years after radiation therapy with a good knowledge of tissue irradiation fields, degree of healing and vascularity of the region16.

Prevention is the most effective technique used to avoid hemorrhage. When the platelet count is low (eg < 20000/mm^3), even tooth brushing can be traumatic. Cleaning of the mouth should be carried with disposable sponge, a sterile piece of gauge, or a cotton swab with chlorhexidine 0.12% or povidine iodine rinse.[2]

Antiemetic agents may prove useful in reducing or preventing nausea, vomiting. High-caloric, high-protein supplements are often of benefit to the maintenance of nutrition during therapy.[7]

AFTERCARE FOR CHEMOTHERAPY PATIENTS

This is the best time to deliver postponed dental procedures. Oral hygiene care should include daily tooth brushing with soft brushes. Saline and bicarbonate rinse, oral lubricants with surface anesthesia, chlorhexidine mouth wash should be continued to prevent infection and to get relief from residual xerostomia. Fluoride application and diet counseling to prevent xerostomia induced caries is imperative[10].

Cancer patient should be on recall programme for the following reasons[12]:

1. A patient with cancer tends to develop additional lesions.
2. Latent metastasis may develop.
3. The initial lesions may recur.
4. Complications related to therapy can be detected and managed.

Mucositis can be managed by use of the following[14]:

1. A bland mouth rise (salt+soda water)
2. Topical anesthetics (5% lidocaine) and

antihistamine solution (benzydamine HCL)

3. Antimicrobeal rinse eg. Chlorhexidine
4. Anti inflammatory agents (kamillosan liquidin or topical steroids (dexamathasone)
5. Adequate hydration
6. Oral lubricants
7. Humidified air

If the patients is immunosuppressed from chemotherapy, and the white blood count fall below 2000/mm^3, the immune system is less able to manage these infections. Moreover, quantitative decrease in actual salivary flow and opportunistic infections are also common in patients who receive chemotherapy or radiations. Antifungal (Nystatin) should be used on detection of candida.[15]

OSTEORADIONECROSIS FOLLOWING RADIOTHERAPY

Osteoradionecrosis is a condition characterized by exposed bone that fails to heal after high dose radiations to the jaws. Protocols to reduce the risk of osteoradionecrosis include selection of endodontic therapy over extraction, use of nonlidocaine local anesthetics that contain no or low concentration epinephrine, a traumatic surgical procedures (if surgery is necessary); prophylactic antibiotics plus post surgical antibiotics during the week of healing and hyperbaric oxygen before invasive procedure.[9]

Once necrosis occurs, conservative management usually is indicated. The exposed bone should be irrigated with a saline or antibiotic solution, and the patients should be directed to use oral irrigating devices to clean the involved area. Bony sequestrum should be removed to allow for epithelization.[8]

CORRESPONDENCE TO

Dr. Sunita Malik W/o Dr. Dinesh Malik 1162, Sector-3, Rohtak E-mail : sunita_malik@sify.com Mobile No. : 09896664444, 09812038636

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Author Information

Virendra Singh, M.D.S. (Oral & Maxillofacial Surgery)
Government Dental College, Pt. Bhagwat Dayal Sharma, Post Graduate Institute of Medical Science

Sunita Malik, M.D.S. (Std.)
Government Dental College, Pt. Bhagwat Dayal Sharma, Post Graduate Institute of Medical Science