

Review Article

Palliative Care in Patients with Oral Cancer

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ABSTRACT

Palliative care is a specialized area of healthcare that focuses on relieving and preventing the sufferings of a terminally ill patient. Oral cavity cancer is one of the most fatal diseases causing significant morbidity and mortality among patients. It can cause various symptoms like pain, discomfort, dysphagia, difficulty in chewing and difficulty in speaking that can significantly affect the quality of life of such patients. Current treatment options include surgery, radiotherapy and chemotherapy. Though the treatment and curing of the diseases is important, it is also important to alleviate the symptoms and sufferings in a terminally ill patient. This requires multidisciplinary approach allowing the palliative care team to address physical, emotional, spiritual, and social concerns that arise with such patients. This paper gives an overview of the various strategies in management of patients with oral cavity cancer and thus provides the best possible quality of life for both the patient and their family.

KEYWORDS: Oral Cancer, Palliative Care, Pain, Oral Mucositis, Xerostomia, Taste loss, Candidiasis Osteoradionecrosis.

INTRODUCTION

Oral cavity cancer is the sixth leading cause of cancer worldwide. The incidence of oral carcinoma varies throughout the world with estimates exceeding 40 in 100,000 in parts of France, Southeast Asia, Hungary and Singapore.^[1] India is said to have the major number of oral cancer patients and the leading etiological factor is said to be the use of tobacco which is consumed largely in India particularly in the smokeless form.^[2]

Palliative care is a specialized area of healthcare that focuses on relieving and preventing the suffering of patients. Due to both the patterns of disease recurrence and

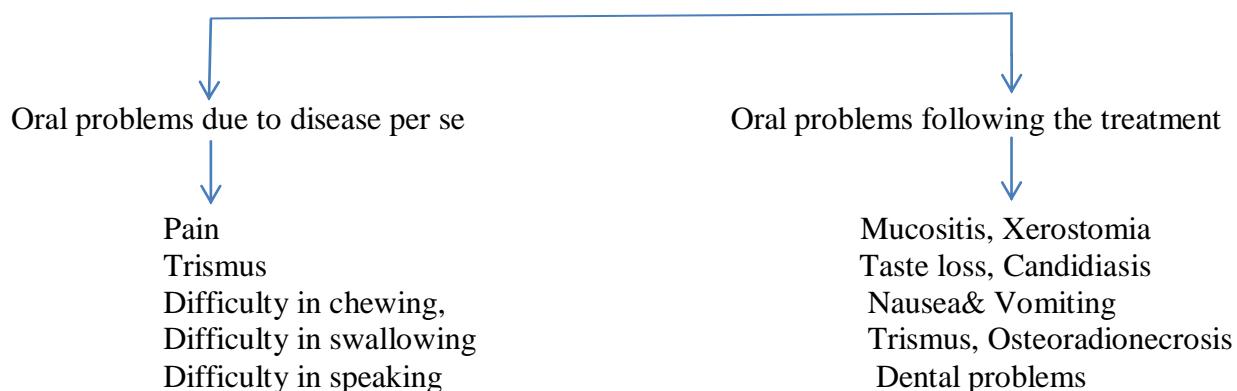
the adverse effects of treatments, patients with oral cancer often have a complex and prolonged course of illness that is marked by periods of freedom from disease and symptoms interspersed with bouts of serious illness, debility, and numerous physical and psychological symptoms including pain, dysphagia, weight loss, disfigurement, depression, and xerostomia. Although the concept of palliative care is not new, most physicians have traditionally concentrated on trying to cure patients, but alleviation of symptoms and improving the quality of life in such patients is also very important.

The distressing symptoms in patients with oral cancer can be either due to the

disease itself or as a consequence of the treatment (Table1). Palliative care to such patients should be aimed at relieving these symptoms at both levels and also the less recognized symptoms like depression, anxiety, caregiver distress and economic distress should also be considered. Studies have shown that among the occurrence and severity of symptoms, the most prevalent severe symptoms were problems with pain, mouth/throat sores, tasting food, difficulty with chewing or swallowing, dry mouth and fatigue. [3] A study explored relationships between oral symptom burden, energy and protein intake and weight change over time

among head and neck cancer patients who have completed concurrent chemo radiation and it was concluded that xerostomia and mucosal sensitivity were significantly related to oral energy and protein intake post-CCR and weight loss was greatest from diagnosis to treatment completion. [4] Therefore assessment of oral symptom burden and its proper management is very essential for a good patient care. This article gives an overview of the management of various symptoms experienced by a patient suffering from oral cancer.

Table 1-Palliative care and oral cancer
ORAL CANCER



MANAGEMENT OF MUCOSITIS

Oral mucositis is described as the inflammation of oral mucosa resulting from chemotherapeutic agents or ionizing radiation. Mucositis typically manifests as erythema or ulcerations. It is a major cause of morbidity in cancer patients and results from the exposure of the underlying connective tissue to the oral environment and the tissue's reaction to the insult. The oral mucosa in the path of radiation first appears hyperaemic and oedematous and as the treatment continues, the mucosa becomes denuded, ulcerated and covered with a fibrinous exudate leading to mucositis. [5] Oral mucositis can lead to great

discomfort, pain, inability to eat and sometimes secondary infection can occur. Trott et al reported that approximately 16% of patients receiving radiation therapy for head and neck cancer were hospitalized due to mucositis. Further, 11% of the patients receiving radiation therapy for head and neck cancer had unplanned breaks in radiation therapy due to severe mucositis [6]. The degree and extent of oral mucositis that develops in any particular patient and site appears to depend on factors such as age, gender, underlying systemic disease and race as well as tissue specific factors (e.g. epithelial types, local microbial environment and function). [7] A wide variety of scales

have been used to record the extent and severity of oral mucositis in clinical practice and research. The World Health Organization (WHO) scale is a simple, easy to use scale that is suitable for daily use in

clinical practice. This scale combines both subjective and objective measures of oral mucositis (table-2) [8]

Table 2- World Health Organization assessment scale for oral mucositis^[8]

Scale	0	1	2	3	4
WHO Oral Toxicity Scale	None	Soreness and erythema	Erythema,ulcers patient can swallow solid diet	Ulcers,extensive erythema,patient cannot swallow solid diet	Mucositis to extent that alimentation is not possible

Table3: Agents for Mucositis Prevention^[10]

Cryotherapy Oral Cryotherapy (sucking ice chips) with 5FU bolus chemotherapy, high dose Melphalan used in HSCT conditioning regimen
Biological Response Modifiers
Keratinocyte Growth Factor 1 (KGF-1)- Palifermin (Kepivance)
Keratinocyte Growth Factor 2 (KGF-2)
Interleukin-11
Transforming Growth Factor Beta-3
Topical Analgesics BenzylamineHCl topical rinse (e.g. Tantum TM)- to prevent radiation-induced mucositis
Other Agents Under Investigation
Amifostine
Topical Vitamin E, Topical Betacarotene
Prostaglandin E (PGE2) Lozenge
Kamillosanliquidum oral rinse
Glutamine
Granulocyte Colony Stimulating Factor (GCSF)
Sodium Alginate
Misoprostol (topical)
Low Energy Laser Therapy
Radiation Shields
Protegrins/Defensins
Lysofiline

Mucositis Study Group of the Multinational Association for Supportive Care in Cancer and the International Society of Oral Oncology (MASCC/ISOO) has developed clinical practice guidelines for the management of mucositis. According to which, management can be divided into: nutritional support, pain control, oral decontamination, palliation of dry mouth, management of oral bleeding and therapeutic interventions for oral mucositis. [9]

Various topical Bioadhesive Formulations are being developed which form mechanical barriers after combining with saliva and form a protective lipid membrane that strongly adheres to the oral mucosa. [11] Palifermin is a recombinant human keratinocyte growth factor which has

been approved in US to reduce incidence and duration of severe oral mucositis in patients with haematologic malignancies, its efficacy and safety in non-hematologic abnormalities is yet to be established. [12] Lactobacillus brevis CD2 lozenges reduced the incidence of grade III and IV anticancer therapy-induced oral mucositis and were associated with a lower overall rate of mucositis and a higher rate of anticancer treatment completion. [13] Relationship of protein and calorie intake to the severity of oral mucositis in patients with head and neck cancer receiving radiation therapy was evaluated and patients who met protein-related goals during radiotherapy for head and neck cancer had less severe oral mucositis. Therefore nutritional counselling during radiotherapy, with emphasis on

protein goals, may reduce oral mucositis severity. [14]

Table 4- Agents for Mucositis Management-Stepped Approach^[10]

1. Mucosal Coating Agents Alumina suspension (AmphojelTM)- constipating effects Magnesia Suspension (Milk of MagnesiaTM)- laxative effects Alumina and Magnesia Suspension (MaaloxTM)- balanced bowel effects Attapulgite suspension (KaopectateTM)- mild constipating effects • May use 5-10mL 4-6 times daily to coat the mucosal surfaces
2. Water-Soluble Lubricating Agents Artificial Saliva (e.g. Moi-Stir™, Salivart™)- 1-2 mL PRN OraBase™
3. Topical Analgesics/Anti-inflammatory Agents Benzydamine topical rinse (e.g. Tantum™)- No effect on gag reflex • Rinse mouth with 10-15 mL q 4-6 hours; swish around mouth and spit out • May have a drying effect (from alcohol in formulation) May consider systemic analgesics (e.g. Acetaminophen) or non-steroidal anti-inflammatories (e.g. ibuprofen, naproxen)- unless contraindicated for patients at risk of febrile neutropenia
4. Topical Anesthetics/Pain Relief Mouthwash Formulations Lidocaine: Viscous, Ointment, Sprays (e.g. Xylocaine™)- Xylocaine Viscous is a thick paste, most patients dislike the sensation of this viscous product • Swish and swallow slowly or spit out of mouth 5-10 mL q4h PRN; may inhibit gag reflex- do not eat or drink for at least 30 minutes after dose • Anesthetic effects occur in 5 minutes and last 20-30 minutes Diphenhydramine liquid (e.g. Benadryl™)- may cause sensitization of the mucosal tissue; used in patients who cannot tolerate other anesthetics • Swish and swallow 5-10 mL q4h PRN; Use non-alcoholic liquid formulation • Lidocaine and/or Diphenhydramine are components of the Pain Relief Mouthwash formulations
5. Systemic Analgesics Opioid Drugs: Oral, IV Bolus Morphine or Hydromorphone Continuous infusion, PCA dosing of Morphine or Hydromorphone for severe pain- Use according to institutional policy
6. Cellulose Filmforming Agents Film-forming Agents (e.g. Film-forming Hydroxy-propylcellulose [GelclairTM], when available in Canada; or other available products)

MANAGEMENT OF PAIN

Many oral complications are associated with pain, both local and systemic. The pain is mainly due to mucositis which causes ulceration, inflammation and the release of various cytokines, all of which are associated with local pain. The physician should assess the intensity of the patient's pain, the characteristics of the pain, the patient's emotional response to the pain and the effect of the pain on the patient's ability to function.

Pain management may be local, systemic, or both. Severe pain may require parenteral opioid therapy during the maximum period of mouth pain. Pain may be managed by the use of topical analgesics to reduce somatic pain, or topical anaesthetics to numb the painful tissues. Other patients require less strong measures. In addition to mucositis, pain is exacerbated by oral infections, xerostomia or pre-

existing oral disease. Management of the infection or other comorbid condition may reduce pain for many patients. [15]

According to the best practice guidelines, patients who experience oral pain, alone or in combination with other oral complications, may be treated with coating suspensions, topical analgesic solutions, topical anaesthetics or pain relief mouthwash suspensions, and systemic analgesics (for increasing severity of the pain). [16]

For patients with localized areas of oral pain, local application of a topical anaesthetic agent is preferred. If the pain is throughout the oral cavity, the patient may require more widespread application. Some commercial products are used as topical analgesics (e.g. benzodamine solution) or topical anaesthetics (e.g. diphenhydramine suspension). These may reduce inflammation or cause mild numbing effect. [17] Many extemporaneously prepared

mixtures incorporate a coating agent such as milk of magnesia, attapulgite (kaolin with pectin) suspension, mixtures of aluminum, and/or magnesium hydroxide suspensions (many antacids) combined with a topical anaesthetic agent to provide relief. [18]

Mixtures of topical anaesthetics, analgesic agents, and antacids also are used to decrease oral pain and discomfort. Capsaicin preparations may be effective in controlling oral mucositis pain. [19]

Table 5- Best practice guidelines for pain management using mouthwashes.^[10]

Pain Relief Mouthwash with Attapulgite(Kaopectate™) Mild constipating effect
<ul style="list-style-type: none"> Diphenhydramine 6.25mg/5 mL (Benadryl™) liquid 50 mL Lidocaine (Xylocaine™) viscous 2% 25 mL Attapulgite (Kaopectate™) suspension 25 mL TOTAL VOLUME 100 mL
<ul style="list-style-type: none"> After brushing teeth and rinsing mouth, swish 10-15mL for up to 2 minutes, then spit out or swallow slowly. Repeat TID-QID PRN. Avoid putting anything in the mouth (including medications) for 30 minutes, especially if mouthwash swallowed. Lidocaine may inhibit gag reflex. Systemic absorption of swallowed lidocaine may be contraindicated in patients with impaired cardiovascular function. Do not give more than 6 times daily. If this is a problem, order Pain Relief without Lidocaine. Duration of action of lidocaine about 30-60 minutes. In Capital Health: If the order reads "Magic Mouthwash", Pharmacy will automatically substitute Pain Relief Mouthwash with Attapulgite
Pain Relief Mouthwash with Antacid Balanced effect on the bowels
<ul style="list-style-type: none"> Diphenhydramine 6.25mg/5 mL (Benadryl™) liquid 50 mL Lidocaine (Xylocaine™) viscous 2% 25 mL Magnesia-Alumina Concentrate Suspension (Maalox TCTM) 75 mL TOTAL VOLUME 150 mL
<ul style="list-style-type: none"> After brushing teeth and rinsing mouth, swish 10-15mL for up to 2 minutes, then spit out or swallow slowly. Repeat TID-QID PRN. Avoid putting anything in the mouth (including medications) for 30 minutes, especially if mouthwash swallowed. Lidocaine may inhibit gag reflex. Systemic absorption of swallowed lidocaine may be contraindicated in patients with impaired cardiovascular function. Do not give more than 6 times daily. If this is a problem, order Pain Relief without Lidocaine. Duration of action of lidocaine about 30-60 minutes
Pain Relief Mouthwash without Lidocaine Mild constipating effect
<ul style="list-style-type: none"> Diphenhydramine 6.25mg/5 mL (Benadryl™) liquid 50 mL Attapulgite (Kaopectate™) suspension 50 mL TOTAL VOLUME 100 mL
<ul style="list-style-type: none"> After brushing teeth and rinsing mouth, swish 10-15 mL for 2 minutes, then swallow. Repeat TID-QID PRN. Do not put anything (except water) in the mouth for 30 minutes after treatment. Administer Pain Relief Mouthwash before any other medications and wait 30 minutes before administering. Used for patients who cannot tolerate lidocaine anesthetic. Diphenhydramine may cause sensitization of the oral tissues.

Table6-Commonly used non opioid drugs^[20]

Acetaminophen	325–1000 mg POq4–6h PRN	4000 mg/day
Aspirin	325–650 mg POq4h PRN	4000 mg/day
Diclofenac	50 mg POBID-TID	150 mg/day
Etodolac	200–400 mg POq6–8h	1200 mg/day
Ibuprofen	400–600 mg POq4–6h PRN	3200 mg/day
Indomethacin	25–50 mg POTID	200 mg/day
Ketoprofen	25–50 mgPO q6h–q8h	300 mg/day
Meloxicam	7.5–15 mg POonce daily	15 mg/day
Celecoxib	200 mg PO BID	400 mg/day
Piroxicam	20 mg POonce daily	20 mg/day

Systemic analgesics such as acetaminophen and codeine may be administered when topical anaestheticstrategies are not

sufficient for clinical relief. Acetaminophen elixir can be swished in the mouth and then swallowed for local and systemic relief of pain. When pain is severe, opioids may be needed. Opiates such as morphine havebeen effective in relieving severe and transient pain associated with oral complications.

Abbreviations-PO, oral; IM, intramuscular; IV, intravenous; PRN, as needed; BID, twice daily; TID, three times daily; NSAID, non-steroidal anti-inflammatory drug; SR, sustained release.

Table7- Opioid drugs used in severe pain.^[21]

Opioid drug	Equi-analgesic dosage	Initial oral dosage	Oral dosage	Parenteral dosage
Morphine	30 mg every 3 to 4 hours	10 mg	30 mg every 4 hours	
Codeine	180 mg every 3 to 4 hours	-	60 mg every 3 to 4 hours	
Oxycodone (Roxicodone)	30 mg every 3 to 4 hours	10 mg	10 mg every 3 to 4 hours	
Hydromorphone (Dilaudid)	7.5 mg every 3 to 4 hours	1.5 mg	6 mg every 3 to 4 hours	
Levorphanol (Levo-Dromoran)	4 mg every 6 to 8 hours	2 mg	4 mg every 6 to 8 hours	
Methadone	20 mg every 6 to 8 hours	10 mg	20 mg every 6 to 8 hours	
Tramadol (Ultram)	100 mg four times daily	80 mg	50 mg every 6 hours	
Fentanyl (Duragesic)	24-hour dose of any of the above is equivalent to 50 µg per hour of transdermal fentanyl		25 µg per hour patch	

MANAGEMENT OF XEROSTOMIA

Xerostomia or dryness of mouth is one of the earliest and most universal complaints of patients receiving therapeutic radiation for oral cancers. ^[22] Alterations in the salivary glands characterized by diminution or even complete loss of secretion may occur within a week or two after beginning of radiation. Glandular damage and long term loss of function is directly related to the amount of radiation exposure. Salivary flow reduces to 50–70% of baseline after 10–16 Gy radiation and is undetectable after 40–42 Gy radiation and the radiation induced damage to the salivary glands alters the volume, consistency and pH of secreted saliva. ^[23]

Clinical management of salivary gland hypo function and xerostomia include ways to (1) prevent or minimize radiation injury of salivary gland tissue (2) manage radiation-induced hypo salivation and xerostomia, and (3) restore the function of salivary gland tissue damaged by radiotherapy.

Water-soluble lubricants should be used to lubricate the oral tissues and should be applied thinly over the mucosal surfaces. Mouth rinses that contain alcohol should be avoided as they will further desiccate the mouth. Sugar free topical agents aid in salivary stimulation and can assist in augmenting existing salivary glands to produce saliva. Topical use of malic acid, vitamin C and citric acids can stimulate saliva; however, their low pH contributes to

tooth demineralization. ^[23] Saliva substitutes are beneficial for the patient and should be used before eating to improve swallowing.

Table 8- Best practice guidelines for the management of the Xerostomic Patient. ^[10]

Plaque Removal Tooth Brushing
Flossing
Other Oral Hygiene Aids
Remineralization Topical High Concentration Fluorides
Children: Topical and Systemic
Adults: Topical
Remineralizing Solutions
Antimicrobials Chlorhexidine Solutions (rinses)
Povidone Iodine Oral Rinses
Tetracycline Oral Rinses
Sialogogues Pilocarpine
Bethanechol
Antholetrihione (SialorTM)

The two pharmacologic agents most commonly used to stimulate salivary output are cholinergic agonists-pilocarpine and cevimeline. ^[24] Pilocarpine hydrochloride, in a dose of 15-30mg daily not exceeding 10mg/dose and cevimiline 30mg tid, 12 weeks of uninterrupted therapy is recommended. These drugs are contraindicated in uncontrolled asthma, acute iritis, and narrow angle glaucoma. Common side effects are nausea, rhinitis headache, dizziness etc.

Amifostine is a cytoprotective agent, FDA approved for xerostomia prevention in patients undergoing radiation treatment, when the radiation port includes substantial portion of parotid glands. ^[25] This therapy can minimize the radiation dose to surrounding normal tissues while at the same time delivering tumoricidal dose to the

tumour target. Acupuncture is an increasingly accepted means for controlling pain, chemotherapy-induced nausea, and hot flushes. Studies suggest that it may also be beneficial in relieving symptoms of xerostomia [26]. Future strategies may include advanced three-dimensional intensity-modulated RT techniques, salivary gland transfer, newer sialogogues, and gene therapy.

MANAGEMENT OF TASTE LOSS AND CANDIDIASIS

Table 9- Best practice guidelines for the management of Taste Alterations.(Adapted from Best Practice Guidelines for the Management of Oral Complications from Cancer Therapy by Broadfield L, Hamilton J.2006) [10]

<ul style="list-style-type: none"> • Increase the palatability of foods (e.g. with seasonings, sugar to balance against bitterness) • Refresh the mouth. Regular frequent mouth care, before and after meals. • Try eating meats cold • Hard, sugarless candies; soft mints; sugarless gum. • Take small bites and chew food thoroughly to stimulate taste sensations. • Use plastic cutlery to reduce potential metallic taste from metallic utensils
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Table 10- Best practice guidelines for management of oral candidiasis. [10]

<ul style="list-style-type: none"> • Fluconazole 100 mg daily is equal or more effective against oropharyngeal candidiasis in cancer patients than nystatin or clotrimazole. Prophylactic fluconazole 100 mg PO daily (400 mg PO daily for HSCT patients) may be considered for prevention of oral candidiasis in cancer patients. Maintenance therapy to prevent relapse after initial treatment- 50 mg (up to 400 mg) daily.
<ul style="list-style-type: none"> • Nystatin suspension 100,000U/mL- Use in patients who cannot tolerate Fluconazole (or other azole antifungals); Swish around and hold in the mouth for at least one minute, then swallow; use 5 mL qid for 7-14 days (works by direct contact) • For children, use 2mL for infants, or 4 to 6 mL for children- Swish and swallow or swab mouth QID • Nystatin cream to treat dentures • Nystatin popsicles (for cooling relief)
<ul style="list-style-type: none"> • Clotrimazole oral suspension 1mg/mL- Swish around the mouth for one minute and then swallow; use 10 mL qid • For children, use 3mL if < 1 year, 5mL if 1-3 years, , or 10mL if > 3 years- Swish and swallow or swab mouth • Clotrimazole troche 10 mg 5 times per day

In irradiated patients, the most common clinical infection of the oropharynx is candidiasis. Many patients become colonized intra-orally with *Candida albicans* during radiotherapy. Ramirez-Amador et al. showed that the prevalence of positive *Candida* cultures increased from 43% at baseline to 62% at completion of radiotherapy and to 75% during the follow-up period. [27] Candidiasis mainly persists in patients with continuing hyposalivation and may enhance the symptoms of mucositis, may be associated with discomfort and change in taste. Patients can be managed with topical antifungals as oral candidiasis

Patients undergoing radiotherapy and chemotherapy for oral cancers experience reduced taste function due to the damage to the microvilli and outer surface of taste cells. [27] This could limit the food intake and lead to weight loss. Loss of taste is usually transient and gradually returns to normal or near-normal levels within one year after radiotherapy, although it can take as long as five years. The degree of taste recovery and the recovery time depend on the radiation dose received.

does not lead to systemic infection unless patient is immunocompromized. [28]

Systemic antifungals should be reserved for cases in which topical agents are ineffective or if compliance with topical oral therapy is poor.

OSTEORADIONECROSIS

Osteoradionecrosis (ORN) is a significant complication of head and neck radiotherapy. In this condition, the bone within the radiation field becomes devitalized and exposed through overlying skin or mucosa persisting as a non-healing wound for three months or more. It starts as small area of mucosal breakdown with

exposure of underlying bone and leads to trismus, neuropathic pain, chronic drainage as it progresses. [29] ORN should be regarded as a chronic wound in which necrosis is compounded by hypoxia. Contamination by a variety of aerobic and anaerobic organisms leads to infection which further enhances hypoxia and leads to further necrosis.

Hyperbaric oxygen (HBO) therapy is said to be helpful in the treatment, which increases the oxygenation of tissues through angiogenesis, controls infection, predominantly through enhanced bacterial killing fungi macrophages and the production of bactericidal free radicals and by stimulating fibroblast replication and development of a collagen matrix (healing). [30] Marx introduced a protocol for the treatment of ORN that combines HBO therapy (HBO) and surgery as its primary treatment modalities. He concluded that HBO alone cannot heal ORN wounds, suggesting that HBO without aggressive surgical management would not resolve the

disease progress in most cases, main contraindications against the employment of HBO are some drugs, non-treated pneumothorax, neuritis, some forms of pulmonary disease, smoker's emphysema, and active viral infections. [31]

Other Treatment Modalities- Ultrasound has proved to be therapeutically valuable by stimulation of tissue regeneration, increase blood flow in chronically ischaemic muscles, protein synthesis in fibroblasts, healing of ischaemic varicose ulcers. Eppley et al. suggested the use of fibroblast growth factor (FGF) prior to bone grafting, showing improved vascularity in the irradiated soft tissue bed, and reduced risk of bone graft failure in rabbits. Dion et al. used pentoxifylline to heal soft tissue radio necrosis wounds in the oral mucosa. Calcitonin has also been used successfully to treat ORN. Electrotherapy has also been suggested, but all these techniques have yet to be confirmed. [32]

Table 11- Best practice guidelines for management of Osteoradionecrosis. [10]

- Elimination of trauma
- Avoidance of removable dental prosthesis if the denture bearing area is within the ORN field
- Adequate nutritional intake
- Discontinue tobacco and alcohol use
- Topical antibiotics (e.g. tetracycline) or antiseptics (e.g. chlorhexidine) may contribute to wound resolution.
- Hyperbaric oxygen therapy (HBO).
- Surgical debridement of necrotic bone, as required.
- Partial mandibulectomy for severe cases of ORN

PSYCHOLOGICAL AND OTHER FACTORS

Frequently, many of the oral cancer patients cannot conceal the effects of treatment because of the very visible nature of their condition and obvious functional difficulties. They must also embrace the reality of profound changes in relation to their speech, ability to swallow, taste, as well as noticeable alterations in appearance. Such factors can be emotionally traumatic to the patient. Chen et al evaluated the

depression among patients undergoing radiotherapy for head and neck cancer and found that significant percentage of people experienced severe depression during and after the treatment and an alarming number of patients have symptoms suggestive of psychosocial distress even before beginning treatment. This proportion increases significantly during radiotherapy. [33] Therefore psychiatric interventions in these patients are important.

Table 12- Best practice guidelines for maintenance of oral health. [10]

Patient Education:
<ul style="list-style-type: none"> • All patients should be taught on oral care at commencement of chemotherapy, immunosuppressant drugs, any disease which causes immunosuppression , or radiotherapy to the head & neck • Use appropriate patient information material(s) to supplement verbal education on all aspects of this care plan • Patients should be aware that they will be reminded and encouraged frequently to perform their mouth care even when they feel sick or tired. • Encourage family participation in mouth care when appropriate.
Flossing:
<ul style="list-style-type: none"> • If patient has flossed regularly, encourage patient to continue flossing as per usualhabit (at least once daily, preferably at bedtime). • Continue to use the same floss as before (e.g. waxed, unwaxed, denotape, dental floss, fine, regular). • If patient has not flossed routinely to date, do not initiate just before treatment begins. • Discontinue flossing if gums bleed for more than 2 minutes. Advise patient to restart flossing when the platelet count rises above 20 x 10⁹/L <p>Head and Neck cancer patients: Flossing may not be appropriate because of tumour involvement and location.</p>
Brushing:
<ul style="list-style-type: none"> • If flossing, floss before brushing. • Brush teeth 4 times daily, within 30 minutes after eating, and before going to bed. • Use an ultra soft toothbrush (e.g. Butler 449). • Rinse brush with hot water to soften it just before brushing. • Brush surface of tongue gently from back to front. • Use non-abrasive toothpaste with fluoride. Gel paste can be less abrasive. • Clean brush after each use with hot water. Air dry. • Change toothbrush often (e.g. once per month, on average) or when bristles are not standing up straight. <p>Head and Neck cancer patients: Brushing may not be appropriate because of tumour involvement and location.</p>
Dentures or Bridges:
Brush and rinse dentures after meals and at bedtime. Rinse dentures with the mouth rinse solution before placing them in the mouth. Remove dentures from the mouth for long periods, at least 8 hours per day. Soak them in the denture cleaning solution,mouth rinse solution or water (patient choice).
Rinsing:
<ul style="list-style-type: none"> • After flossing and brushing, the mouth should be rinsed with a mouth rinse to remove remaining debris and toothpaste (which may irritate the tissue). Rinse as vigorously as able after each brushing (4 times daily). • Rinse BEFORE applying topical agents, since any therapeutic agent will penetrate oral tissue more effectively when the mouth is free of debris and saliva. • Rinse the oral cavity thoroughly without dentures in place. • Offer the patient the following options for rinse solutions: <ul style="list-style-type: none"> • Soda Water (Club Soda) • Normal Saline • Sodium Bicarbonate Solution • Tap water (or bottled water, especially where water is contaminated) • DO NOT USE – Commercial mouthwash products, glycerine products, or hydrogen peroxide.
Lip Care:
<ul style="list-style-type: none"> • Coat lips with an oil-based or water soluble lubricant to keep them moist. Water soluble lubricants may be used inside and outside the mouth, and can be used with oxygen, since there is no risk of aspiration. • Apply the lubricant after each cleaning,at bedtime, and as needed. Water-based lubricants need to be applied more frequently. • Some water soluble lip lubricants to consider include: <ul style="list-style-type: none"> • Glaxal Base cream • Derma Base (K-Y Jelly &Dermasone) • Eucerin/glycerine/water cream (from QEII HSC stores) • Examples of oil-based lubricants include lanolin, petroleum jelly, mineral oil and cocoa butter. • Encourage patients not to touch their lip lesions.
Eating:
Avoid abrasive, rough, spicy, acidic and hot foods. All irritants should be avoided, especially alcohol and tobacco. Eat soft foods. Avoid foods containing a lot of sugar, and really cold foods. Encourage high-density and high-fibre foods to clean teeth and massage gums. Encourage a well-balanced diet, high in protein, vitamins B & C. Encourage a fluid intake of at least 2 litres per day.

Cancer patients undergoing high dose chemotherapy and/or radiation can experience fatigue related to either disease or its treatment. These processes can produce sleep deprivation or metabolic disorders, which collectively contribute to compromised oral status. It is important to

support the patient during the periods of fatigue and frustration. Reassurance that the feelings are normal and that it will improve in time should be balanced with gentle but firm encouragement to continue the mouth care practices even when the patient seems to have no energy. Involvement of the

family to help perform mouth care practices may be particularly important during periods of fatigue (and pain).

Studies have shown that the family and households of the patients with terminal cancer were greatly impacted by the illness.^[34] Anxiety and depression is often present in family care givers of the patients. Long term patient's quality of life is the result of a frail balance between family care giver and patient's emotional and psychological distress.^[35] Psychological support for the family care giver could improve patient's well-being.

DENTAL PROBLEMS AND MAINTAINENCE OF ORAL HEALTH

The most threatening complication for the dentition is radiation-related caries which is a rapid form of caries and destructive in nature. A proper orodental care regime has to be followed by the patient during the course of the treatment and also post treatment. Regular oral prophylaxis with topical fluoride application has to be done to prevent radiation induced caries. Patients should be encouraged to brush twice daily using a soft toothbrush and 0.2% chlorhexidine or betadine mouth rinse twice daily can be given to maintain adequate oral hygiene.

CONCLUSION

Terminally ill patients with oral cavity cancer require palliative care and special dental attention. The main objective of the treatment should be to improve the quality of life of such patients. Oral and dental care is important in all phases of treatment of patient with oral cancer. The complications of radiotherapy must be considered thoroughly and every effort should be taken to minimize the oral morbidity during and after cancer treatment. The palliative care of such patients should involve multidisciplinary approach that

addresses physical, emotional, spiritual, and social concerns of the patient.

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