Review Article

Palliative oral care in patients undergoing radiotherapy: Integrated review

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Abstract

Maintaining a patient's quality of life is main the aim while treating cancer patients. Patients getting treated for oral cancer encountered with numerous symptoms at the time of radiotherapy and most of these are side effect which can persist even after few months to year after the treatment gets over. Radiotherapy is a vital aspect of both curative and palliative cancer care. Understanding the basics complications of radiotherapy along with its primary management of oral symptoms can assist family physicians in providing complete primary care for their cancer patients. Palliative oral care helps to ease symptoms from the cancer treatment. Oral care negligence is still a major cause of worsening of posttreatment quality of life of an individual. The article mainly empathies on the oral health care need to be taken care by primary care physicians in the cancer patients during and after the radiotherapy. Consequences associated with radiotherapy in oral cavity and its systematic overview of preventing and managing acute and chronic condition. It enlightens the importance of dentist role on improving quality of life of these patients.

Keywords: Mucositis, osteoradionecrosis, palliative oral care, primary care, radiation caries

Introduction

Palliative care is the total care of patients whose disease is not responding to curative treatment. It should be aimed to improve the quality of life of patients and their families facing the problem associated with life-threatening illness.[1] Oral health is equally important for the general wellbeing of the person. The fact that oral health has a direct effect on overall physical and mental health has been established by a large number of studies and researches worldwide. Palliative care of head and neck cancer patients has become a subspecialty in the field of oncology. Emotional impact of the diagnosis and treatment of cancer is quite challenging task. Primary care physicians' main concern is to provide palliative care that mainly covers psychosocial and emotional needs by limiting painful oral discomfort and to relieve stress and anxiety of these patients undergoing cancer radiotherapy. Clinicians should perceive thoughts and feeling of the patient's state of mind and they should be adequately managed. Palliative and supportive care is a multidisciplinary approach. Radiotherapy in cancer care includes curative treatment, palliative symptom control, and management of oncologic emergencies. Practicing dental surgeon, specially Oral Medicine and Radiologist specialist plays a vital role in early detecting Oral cancerous and precancerous lesions and conditions like leukoplakia, oral submucous fibrosis, and various

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ulcerative lesion for maintaining Oral hygiene status of these patients. There should be a symbiotic relationship between an oncologist and a dentist to reduce and eliminate the dreadful complications like radiation-induced mucositis, xerostomia, osteoradionecrosis of maxilla and mandible, radiation caries, changes in taste perception, fibrosis of muscles of mastication, and alteration of tooth shape and size. Early clinical diagnosis of these oral conditions should be aimed to minimize pain and suffering in these patients undergoing radiotherapy.[2,3]

Primary care physicians need to provide special attention in oral care, ranging from operative and preventive care during radiotherapy. The importance of dental care is often neglected due to the omission of the dentist as a member of the palliative care team. Palliative care dentists should exhibit empathy and compassion, and should be excellent communicators.[4] Patients undergoing radiation therapy results in both acute and long-term consequences to the oral mucosa, salivary glands, teeth, and bone. The most frequently documented source of sepsis in the immunosuppressed cancer patient is the mouth. Therefore, early and definitive dental intervention, including comprehensive oral hygiene measures, reduces the risk for oral and associated systemic complications.[5] Numerous oral pathogenic conditions like gingival inflammation, broken teeth, defective restorations, and periodontal disease are mostly initiated complications during and after a course of radiation therapy.[6,7] Chronic and painful oral symptoms lead to discomfort in eating habit which might future deprive of nutrition and psychosocial stress. Oral lesions greatly impact on quality of remaining life of patients, also the initiation and progression of oral lesions may be related to direct or indirect succession of disease.[8]

Effect of Radiotherapy in Oral Cavity and Its Palliative Care

Oral mucositis and stomatitis

Mucositis is a painful ulceration of mucosal linings in the oral mucosa membrane, softpalate, and pharynx. Table 1 shows the grading of oral mucositis as per world health organization.

Mucositis is seen in patients undertaking chemotherapy drugs like 5-fluorouracil and methotrexate, and undergoing radiotherapy.[9] Almost 80% of patients undergoing radiotherapy and chemotherapy is likely to have mucositis.[10] Clinically appears as red or yellowish pseudo membrane formation and ulceration with the formation of white to yellow pseudomembrane.[11] After termination of the therapy, the healing may be complete after about 2 months, but the mucous membrane tends to become atrophic, thin, and relatively avascular, due to the obliteration of fine vasculature and fibrosis of the underlying connective tissue. Patient is usually prone to oral ulcerations and is unable to tolerate dentures.[12] Sloughing of the mucosa noted during fractionated dose of 180–220 cGy/day results in initiation of oral mucositis within 2 weeks.[13] The symptoms include severe pain, compromised oropharyngeal function, and oral bleeding that effect quality of life. It is irreversible as once the radiotherapy stops it heals in few months until then the symptomatic treatment includes frequent water rinses, ice chips. Coating the surface with Aluminum and Magnesium Hydroxide, Hydroxypropyl cellulose, Sucralfate. To reduce the burning sensation topical anesthetics like DyclonineHcl, XylocaineHcl, Benzocaine Hcl ointment should be applied before taking food.[14]

Table 1: Grading of oral mucositis by world health organization.[8]

Grade 1	Erythema, painful ulcers, mild sore throat
Grade 2	Painful erythema and ulcers, edema of oral mucosa, but able to eat solid food
Grade 3	Painful erythema and ulcers, edema of oral mucosa that interferes with eating solid food.
Grade 4	Need for parenteral or enteric support due to severe stomatitis.

Candidiasis

The incidence of candidiasis in palliative care has been estimated to be 70–85%.[2] Predisposing factors are mainly due to immunosuppression, along with use of broad spectrum antibiotics and corticosteroids. Topical application of Clotrimazole ointment to affected areas 2–3 times daily for 3–4 weeks and 2.5 ml 3–4 times daily for 2 weeks will be a relief.[14]

Alteration in taste sensation

Patient has loss of taste in the second or third week of radiation therapy. Radiation in posterior two-third of the tongue alters the bitter and acid taste. Anterior third of the tongue when irradiated effects sweet and salty flavors. These changes in the taste perception may also be attributed to the salivary changes that occur due to radiation.[12] The loss of taste sensation can alter the food habit that can alter the nutritional status of an individual.[15]

Radiation caries

When teeth are exposed to radiation in their developing stage, their development may be retarded. Prior to calcification, the tooth buds get destroyed. After initiation of calcification, there may be inhibition of cellular differentiation causing malformation or arrest of growth. The pulp shows decreased vascularity, reduced cellularity, and the tooth becomes more prone to pulpitis.

This is a rampant form of dental caries which mainly is seen because of secondary changes in the salivary glands and saliva: Decreased salivary flow rate causing reduced lubricating properties of saliva. Decreased pH of saliva and increased viscosity of saliva leads to the decalcification of the enamel and increased accumulation of the food debris. Clinically three types of radiation caries categorizes as follows[12]:

Type 1: Primarily involving cementum and dentin in the cervical areas. This lesion progresses around the tooth circumference and ultimately results in the amputation of the crown.

Type 2: Generalized superficial lesions attacking the buccal, occlusal, incisal, and palatal surfaces of the teeth.
Type 3: Dark pigmentation of the crown surface.

To prevent radiation caries, patients should begin daily fluoride treatment with 1% neutral sodium fluoride gel in prefabricated trays for 5 min each day.[12] Dental care should be accomplished with maintenance of proper oral hygiene, home fluoride treatments using 0.4% stannous fluoride.[16] Reduction of sugar intake, replacement of refined carbohydrates with substances such as sorbitol, xylitol.[17,18]

Salivary gland atrophy and xerostomia

The parenchymal component of the gland is sensitive to radiation. The gland demonstrates progressive fibrosis, adiposis, loss of fine vasculature, and simultaneous parenchymal degeneration.[19] There is marked decrease in the salivary flow. The composition of saliva is affected. There is increased concentration of sodium, chloride, calcium, magnesium ions, and proteins. The saliva loses its lubricating properties. The mouth becomes dry and tender due to xerostomia.[20,21] The pH of saliva is reduced which leads to decalcification of enamel. A compensatory hypertrophy of the salivary gland can also be noted.[22] Xerostomia may subside after 6–12 months after therapy. The xerostomia that persists beyond a year is less likely to show return to normal.[12]

Osteoradionecrosis (ORN)

The primary damage to the mature bone is because of the damage to the fine vasculature which is already sparse in a dense bone such as the mandible. Due to the loss of vasculature and hematopoietic elements, the marrow is replaced by fatty marrow and fibrous connective tissue. The endosteum becomes atrophic, and shows lack of osteoblasts and osteoclastic activity. The complication following irradiation is called osteoradionecrosis. The bone becomes hypovascular, hypocellular, and hypomineralized, with decreased blood supply.[12]

Table 2 shows to lessen the chances of complication of osteoradionecrosis. Prior to beginning radiation therapy, all patients should undergo a thorough dental evaluation, including full mouth radiographs, dental and periodontal assessment, and prognosis for each tooth. Outline a complete treatment plan, taking into account the patient's motivation and compliance based upon discussions with the patient and his or her family. Patient education regarding the need for meticulous oral hygiene and frequent follow-up must be stressed.[23,24]

Table 2: Prior to start radiotherapy following oral condition should be checked thoroughly to avoid complication of osteoradionecrosis.[25,26]

1	Complete Oral prophylaxis should be performed.
2	Extract teeth with more than 4-6 mm pockets, grade-II mobility and furcation involvement.
3	Remove partially erupted third molars and carious teeth with periapical lesions.
4	Weekly dental checkups during radiation therapy and three month dental checkups, possibly lifelong
5	Restore carious tooth
6	Avoid removable or fixed prosthesis for six months before or after radiotherapy
7	Root canal treatments needed to be done
8	Avoid removable prosthetics for six month
9	Prosthetic crown and bridges can be given after six months of radiotherapy

Treatment of ORN is primarily supportive, involving nutritional support along with superficial "Radiation osteomyelitis" when there is soft tissue break down, exposing the bone to saliva with secondary contamination.

Teeth that cannot be restored with conservative or endodontic therapy should be extracted. Extractions should be performed 3 weeks prior to the beginning of radiation therapy. Extraction of teeth during radiation therapy should be discouraged and delayed until the completion of treatment with resolution of the radiation mucositis. If teeth are extracted after radiotherapy, care should be given to use atraumatic technique, smooth sharp edges of bone, and avoid reflection of the periosteum if possible.[27] Initial treatment should always be conservative.

In osteoradionecrosis there will be foul odor, exposed necrotic bone, severe pain, discharging fistula. Debridement and oral saline irrigation for local wounds. Antibiotics are indicated only for definite secondary infection. Hyperbaric oxygen (HBO) therapy is used for management of ORN. HBO transiently elevates tissue oxygen tension and stimulates fibroblastic proliferation and oxygen-dependent collagen synthesis. This allows for angiogenesis in the radiated bed.

Fibrosis of muscles of mastication

Depression is not uncommon in the terminally ill patient. The palliative care dentist must take time to listen to his or her patient.[28] Dentist should aim to maintain the integrity of oral mucosa and prevent caries and periodontal disease, reduce oral pain and discomfort, and prevent or treat infectious complications.[29,30] The trismus and muscle fibrosis will improve with constant exercise regimen.[31] Exercise should be performed deliberately at regular intervals followed by a period of rest.

Inflammations

Radiation-induced fibrosis impairs the lymphatic and venous channels. Edema is most prominent in the submental region following irradiation for anterior tongue and floor of the mouth and occasionally severe enough compromise tongue mobility and salivary control further impending denture wearing and speech articulation.[32]

Summarize to emphasize the importance of patient care during and after radiotherapy by primary care physicians:

- Pretreatment goals
  - Remove the source of oral infection
  - Counseling the patient regarding complications of radiotherapy and its care

  - Advise preventive care to be followed during treatment regime.
- Goals during radiotherapy
  - To recognize and give supportive care for oral mucositis
  - Management of oral candidiasis
  - Manage xerostomia and condition associated with it like dental caries
  - Manage loss of taste sensation and dietary advises
  - Prevent trismus and fibrosis.
  - Giving positive and motivational thoughts to relive stress and anxiety
- Posttreatment goals
  - Manage xerostomia
  - Prevent and minimize trismus
  - Prevent and treat dental caries
  - Prevent post radiation osteonecrosis
  - Detect tumor recurrence.
- Eat a well-balanced diet
- Wear removable dentures or device as little as possible
- Don't smoke and use tobacco products in any form
- Use topical antibiotics
- Use pain killers as required
- Surgery to remove dead bone or rebuild bone of mouth and jaw.

Conclusion

Complications present during and after radiotherapy needs special attention for their prevention and treatment. Palliative dental care should be fundamental in management of patients undergoing radiotherapy. Primary care physicians palliative care aim is to achieve improvement in the cancer patients' overall health condition with main focus on oral health as it plays a main role diet, speech that acts to maintain along quality of life, physiological, and psychological distress in a patient. Dentist surgeon's role as primary care should be anticipated and should always be included in the palliative care unit for betterment of the patient.

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Conflicts of interest

There are no conflicts of interest.

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