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Treatment Plan Assignment

Patient Case:

45 year old male - Systemic Conditions: AIDS and Oral Squamous Cell Carcinoma + Type 3 Chronic Periodontitis. Medication/Treatment: Biktarvy, Chemotherapy and Radiation Therapy.

Part I:

Based upon the patient's medical and drug history, he is diagnosed with HIV and AIDS, oral squamous cell carcinoma and type 3 chronic periodontitis. He is taking Biktarvy which helps to treat his HIV-1 infection. He is also undergoing chemotherapy and radiation therapy for the treatment of oral squamous cell carcinoma. Upon initial assessment of the oral cavity, I may see oral manifestations of AIDS such as oral warts, hairy leukoplakia and oral thrush. Oral squamous cell carcinoma will be seen as white and/or red patches (leukoplakia and erythroplakia) on the tongue, lining of the lips and/or the floor of the mouth. Type 3 chronic periodontitis will exhibit clinical signs such as 5-6mm probing depths with positive bleeding upon probing, 33% bone loss, Miller's classification Type I and II mobility, fremitus and early to moderate furcation involvement. A combination of chemotherapy and radiation therapy will produce similar side effects such as xerostomia, a higher caries risk, difficulty chewing/speaking, oral mucositis and loss of taste. This patient is severely immunocompromised, due to HIV/AIDS and both chemotherapy/radiation therapy; therefore it is important to reduce the bacterial and fungal load in the oral cavity prior to hand scaling and root planing. He is highly susceptible to infection.

In phase I of the treatment plan, it is important to start with a pre-treatment oral health assessment for lesions, ulcers and abnormalities prior to dental treatment. In addition, it is important to receive a medical clearance from the patient's oncologist and primary care physician before any dental treatment. After receiving medical clearance for approved dental treatment, local anesthesia may be recommended

as needed based on the patient's pain tolerance. This is followed by fluoride containing antimicrobial mouth rinse, full mouth prophylaxis and debridement, root planing, polishing, and fluoride applications. Oral hygiene instructions to the patient and caregiver is emphasized because the patient may experience a diminished mental state which decreases his motivation for self care. I will recommend the patient to use a soft bristled power toothbrush for daily brushing and to use it with a sensitive mode when brushing around and near sores/ulcers. Care must be taken to not irritate the sores/ulcers. Interdental aids include the interproximal brush for embrasure spaces and furcation areas. Depending on the patient's dexterity, either string floss and/or water flosser is recommended. It is also necessary to educate the patient and caregiver about infection control at home and to follow standard precautions due to the risk of blood exposure when the patient completes his daily oral hygiene care. Because of the patient's high risk of caries, I will recommend him to reduce the intake of excessive sugar, acidic foods, alcohol and counsel him about smoking cessation if the patient is found to have a smoking habit. Instead, he should increase salivary flow by using saliva substitutes, chewing sugar free gum, staying hydrated and brushing/flossing at least twice a day. If the patient follows strict oral home care directions and returns regularly for recare, his prognosis would range from poor to fair.

Part II:

AIDS (acquired immunodeficiency syndrome) is a condition where the Human immunodeficiency virus (HIV) attacks the immune system. This results in lower amounts of CD4 T cells. Low CD4 T cells prevent the human body from effectively fighting off opportunistic pathogens. AIDS is transmitted through HIV which is present in the blood and bodily fluids. Most people experience symptoms such as fever, fatigue, rash, headache, joint pain, sore throat, and swollen lymph nodes. About 50% of infected people experience night sweats. Oral manifestations include bacteria that can invade our body through the oral cavity. Oral warts can develop anywhere and can be painless which is more common in a HIV positive patient. Hairy leukoplakia can be defined as hairy patches on the surface of the

tongue, unable to be removed by toothbrushing. The appearance of oral thrush is similar to hairy leukoplakia which can be wiped away. Oral thrush is caused by a fungus called candida which can grow beyond the patient's control. The role of the dental hygienist is early detection of HIV related oral manifestations, reduce and control the amount of inflammation and infection, evaluate and provide referral to a HIV/AIDS specialist and patient education. Since AIDS patients are immunocompromised with fewer T-cells present in the body, the patient is more susceptible to gingivitis which most often lead to periodontitis. It is also common for the patient to develop Necrotizing Ulcerative Gingivitis (NUG) and Necrotizing Ulcerative Periodontitis (NUP). Therefore, deep pocketing, clinical attachment loss and bone loss is expected in the AIDS patient. Dental hygiene treatments involve full mouth debridement, gentle flossing after tissue healing and educate patient's use of interdental brush, oral irrigators and mouth rinses to decrease the overall bioburden in the mouth.

Oral cancer, also known as mouth cancer, consistently ranks as one of the top ten cancers worldwide. Oral squamous cell carcinoma often develops after the age of 50. The major risk factor for these neoplasms is chronic exposure of oral mucosa to tobacco and alcohol. Apart from these, human papillomavirus (HPV) infection are found in a variable but small proportion of oral, and other carcinogens for oral cancer which include radiation, UV light radiation, and UV light. More than 90-95% of oral cancers are squamous cell carcinoma. Squamous cell carcinoma typically presents as a persistent mass, nodule, or indurated ulcer. They can develop from precancerous lesions, such as leukoplakia and erythroplakia, or apparently normal epithelium. Squamous Cell Carcinoma most commonly starts as a painless white patch, that thickens, develops red patches, an ulcer, and continues to grow. The three most common sites of involvement are the tongue, lining of the lips and floor of the mouth. On the lips, it commonly looks like a persistent crusting ulcer that does not heal, and slowly grows. Other symptoms may include difficult or painful swallowing, new lumps or bumps in the neck, a swelling in the mouth, or a feeling of numbness in the mouth or lips. Treatment of squamous cell carcinoma depends on the

location and stage of the cancer, and the patient's general health and personal preferences. A combination of treatments may be necessary. Evidence indicates that chronic infections and inflammation are related with increased cancer risk. Periodontitis is an infectious disease thought to be caused by gram-negative anaerobic microorganisms in the dental biofilm, resulting in inflammation within the supporting structures of the tooth, leading to progressive attachment and bone loss, characterized by pocket formation and recession. Periodontitis leads to epithelial proliferation and migration, which results in the chronic release of inflammatory cytokines, prostaglandins, growth factors and enzymes, all of which are closely associated with the development of cancer. Cancer patients may be in a depressed state of mind, which keeps them from regular brushing of teeth and usage of cleaning aids. The cancer patients may undergo chemotherapy/radiotherapy, which would negatively affect the oral hygiene habits. This may increase the likelihood of gingival bleeding and burden of periodontal infection.

Biktarvy is a one a day oral tablet for the treatment of HIV-1. The generic name is bictegravir, tenofovir alafenamide and emtricitabine which are integrase, nucleotide reverse transcriptase, and nucleoside reverse transcriptase inhibitors. Some common side effects are diarrhea, nausea, and headaches. Other side effects that the patient may experience include vomiting, compromised immune system, lactic acidosis, tiredness, shortness of breath, dizziness and abnormal heartbeat. Biktarvy should not be taken if the patient has kidney or liver issues and should not be taken with dofetilide or rifampin. There are no known interactions or effects of Biktarvy on the oral cavity. However, since one of the uncommon side effects is a compromised immune system, healing of the gingiva post debridement may be delayed. Biktarvy will also interact with any anesthetic topicals or injections containing metal cations like calcium, magnesium, aluminum and iron. Administration of any oral creams, gels, and treatments should be taken into account of how it will react with Biktarvy.

Chemotherapy is one of the most commonly used methods for the treatment of cancer. This method involves the use of drugs to prevent the progression of the disease by interfering with the cancer

cells' ability to rapidly divide and grow. However, chemotherapy not only inhibits the reproduction of cancer cells, it also harms the dividing and repairing function of normal healthy cells. As a result, this decreases the patient's immune system which in effect increases the patient's risk of acquiring other diseases and infections. Treatment of cancer with chemotherapy leads to many adverse side effects including the oral cavity. Prior to the start of chemotherapy, it is recommended for the patient to have a comprehensive dental exam in order to determine the patient's oral health status and whether or not they may need any dental work performed. Therefore, the patient must be treated for any existing dental conditions such as periodontal disease and infections before starting chemotherapy treatment. The patient must also be educated about the possible oral complications that chemotherapy can cause and what instructions they must follow in order to manage those complications when they arise. Preventive measures such as oral hygiene interventions, plaque and calculus removal, fluoride application and the use of chlorhexidine mouth rinse are strongly recommended in order to improve the patient's oral health status. With excellent oral health care and the removal of unhealthy and decaying sites within the oral cavity, there will be a reduction in the severity and incidence of oral complications with chemotherapy treatment. Chemotherapy can cause many problems to the patient's teeth, gingiva, mucous membranes and salivary glands. Common side effects of chemotherapy in the oral cavity include the following: infection, xerostomia, alteration of taste as well as a swollen and peeling tongue with burning sensations. Since the number of white blood cells is decreased with chemotherapy treatment, the patient often develops neutropenia. Neutropenia puts the patient at a greater risk of developing oral infections ranging from bacterial, fungal and viral origins. Examples of bacterial infections that may occur include periodontal disease, pericoronitis, periapical infections and necrotizing ulcerative gingivitis. As for fungal infections, the most common development is candidiasis. Also, since the patient is immunocompromised due to chemotherapy treatment, viral infections such as herpes and varicella-zoster virus can be reactivated. In addition, xerostomia is a common side effect due to the impairment of salivary gland

function. This makes it more difficult for the patient to chew and speak. The oral mucosa also becomes more susceptible to trauma with an increased risk of developing oral mucositis. Oral mucositis is a painful inflammation of the oral mucosa. It is usually formed on the labial and buccal mucosa, the soft palate, the floor of the mouth and the lateral surface of the tongue. Oral mucositis first forms as an erythema which is then followed by edema and deep ulceration with severe pain. The possibility of developing oral mucositis increases with the presence of periodontal disease. Therefore, patients who have periodontal disease are more likely to have oral mucositis. Disturbances of taste are common as well and patients often report a loss of taste or having a metallic or bitter taste in the mouth. Also, neurotoxicity may appear and it causes a constant severe pain in the mandible. It usually disappears one week after chemotherapy treatment is completed but there may still be sensitivity present ranging from weeks to months. This would require the patient to use special desensitizing toothpaste to reduce these symptoms post-treatment. Other problems such as oral bleeding and hyperpigmentation of the teeth, gingiva, and mucosal areas are also observed in patients undergoing chemotherapy. Therefore, special care must be taken to not disrupt blood clots when they are present in the oral cavity. In general, dental treatment must not be performed when a patient is undergoing chemotherapy. Unless it is absolutely necessary or in the event of an emergency, dental treatment must be performed with caution due to the patient being immunocompromised. It is important to note that problems involving pain, xerostomia and mucositis must be managed during chemotherapy treatment to relieve the patient from those symptoms. Thus, it is advisable for patients to have regular dental exams during chemotherapy treatment so they can work together with the dentist and dental hygienist to control any dental complications that may arise. Most of the side effects of chemotherapy treatment cannot be avoided but proper preparation and preventive measures must be taken in order to reduce their manifestation. After chemotherapy treatment has been completed, it is essential for the patient to continue re-examinations in three month intervals for the first year and continuing care thereafter. The main goal of the patient and the dental team is to ensure healthy

teeth and gums in order to provide better management of any long-term side effects of the chemotherapy treatment.

Radiation Therapy is a form of cancer treatment that uses ionizing radiation to kill cancer cells. Radiation therapy on the head and neck will create acute and chronic effects within the oral cavity. Oral complications include oral mucositis, xerostomia, hypofunction of the salivary glands, caries (from xerostomia), trismus and loss of taste. Systemic effects include sunburn-like skin reactions, fatigue, nausea, vomiting, constipation, diarrhea, delayed wound healing and bone infections due to lack of blood flow to specific areas of the head. Other infections include bacterial, viral, fungal and osteoradionecrosis. Similar to chemotherapy, it is important for the hygienist to remove the biofilm plaque and calculus from oral cavity and utilize fluoride treatments and chlorhexidine mouthwash to decrease the bioburden before treatment. For patients who are currently receiving radiation therapy it is important to encourage them to brush and floss at least twice a day to effectively remove plaque biofilm. Use of fluoride application at home as an oral rinse or gel in custom molded trays can help combat the high caries risk from xerostomia. Staying hydrated and avoiding spicy/salty foods can help with dry mouth. Saliva substitutes such as Biotene rinse can help as well as chewing sugar free gum to help stimulate the salivary glands. Radiation therapy can facilitate type III periodontitis because the patient is immunocompromised and more susceptible to gingival inflammation and infection. Salivary hypofunction facilitates bacterial growth and causes the oral PH to become acidic due to its inability to buffer. Patient with type III periodontitis will have delayed gingival healing as well as chronic infections within the mouth and clinical attachment loss.

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