Journal of Odontology

OPEN ACCESS Freely available online

Perspective

Effect of Cancer Therapy on Oral Mucositis

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DESCRIPTION

Oral mucositis is an extremely debilitating condition. It can occur due to radiation therapy (RT) to the head and neck, chemotherapy drugs, high-dose chemotherapy drugs, and hematopoietic stem cell transplant (HSCT). It manifests itself as erythema, edema, and ulceration in the oral mucosa and causes pain with consequent limitation of oral intake. In severe cases, this can even lead to the need for parenteral nutrition. In addition, the lesions weaken the skin barrier, leading to local or systemic infection. It is a debilitating condition for patients due to pain and consequent decreased oral intake, which worsens quality of life. In severe cases, it may be necessary to reduce or delay the next course of chemotherapy.

Oral mucositis from radiation therapy begins after 7 to 98 days of head and neck irradiation and begins as an acute inflammation of the oral mucosa, tongue, and throat. Similarly, oral mucositis is secondary to chemotherapy and has a temporal relationship with the dose of stomatotoxic chemotherapy, usually developing within 10 to 14 days after dose administration. It begins as erythema of the mucosa, which later develops into erosion and ulceration. The ulceration is then covered with a white fibrinous pseudomembrane. In immunosuppressed patients or patients undergoing hematopoietic stem cell transplantation, oral mucositis begins to improve as absolute neutrophil counts recover. The patient feels discomfort or pain when eating or may have increased bleeding when brushing teeth. On physical examination, the mucosa may appear red or show a white fibrinous pseudomembrane covering the ulcers. The localization of the ulcers is generally observed on the non-keratinized surfaces of the mouth, e.g. buccal mucosa, lateral tongue, ventral tongue, and soft palate.

Oral mucositis is a common complication in patients receiving radiation therapy (RT) to the head and neck, chemotherapy for solid tumours or lymphoma, and in patients receiving high-dose myeloablative chemotherapy prior to hematopoietic cell transplantation. The incidence of oral mucositis varies between different chemotherapeutic agents. Chemotherapy drugs that affect DNA synthesis (Sphase), e.g. 5-fluorouracil, methotrexate, and cytarabine, have a high incidence of oral mucositis. Anthracyclines, mTOR inhibitors, alkylating agents and antimetabolites also have a high risk of oral mucositis. Chemotherapeutic agents can cause mucositis through indirect and direct mechanisms.

CONCLUSION

The frequency and severity of mucositis vary with the chemotherapy agent, the number of chemotherapy cycles, the chemotherapy dose, and from patient to patient. Patients receiving myeloablative preparations for hematopoietic stem cell transplantation have a higher incidence of oral mucositis. Patients receiving high-dose chemotherapy or undergoing bone marrow transplantation have a 78% risk of developing mucositis. Radiation-induced oral mucositis (RIOM) occurs in head and neck cancer patients treated with modified fractionation radiation therapy. The frequency of mucositis is higher in patients with poor nutritional status and poor oral care.

The pathophysiology behind the development of RIOM and/or oral mucositis from chemotherapy is believed to result from a complex process beginning with tissue injury in a five-step model proposed by Sonis. The five stages (phases) of RT-and/or induced chemotherapy include initiation, signaling, amplification, ulceration, and scarring. First, chemotherapy induces tissue damage through both basal epithelial cell death and the formation of reactive oxygen species. Second, reactive oxygen species cause direct cell death and also upregulate the inflammatory pathway to cause further cell death. Thirdly, other signalling pathways such as TNF-alpha are boosted. Fourthly, mucosal ulceration occurs with increased inflammation. Ultimately, the epithelium undergoes healing through epithelial proliferation.

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Received: 05-Apr-2022, Manuscript No. JOY-22-17863; **Editor assigned:** 08-Apr-2022, PreQC No. JOY-22-17863(PQ); **Reviewed:** 22-Apr-2022, QC No. JOY-22-17863; **Revised:** 29-Apr-2022, Manuscript No. JOY-22-17863(R); **Published:** 06-May-2022, DOI: 10.35248/JOY-22.6.620.

Citation: Grand R (2022) Effect of Cancer Therapy on Oral Mucositis. J Odontol. 6: 620.