Review Paper

Comparison of Radiation-Induced Mucositis With Multiple Oral Ulcers Based on Iranian Traditional Medicine: A Review Study

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ABSTRACT

Objective Radiation-Induced Mucositis (RIM) is more common in patients with head and neck cancers. Common medications have not been fully successful in preventing and treating RIM. We can use the potential of Iranian medicine for prevention and oral/topical treatment of these lesions.

Methods In this review study, the keywords of "Mucositis", "Head and Neck Radiotherapy", "Aphthous", and "Mouth Ulcers" (In Persian) were used for searching in books related to Iranian Traditional Medicine (ITM) and in related papers published online and indexed in Scopus, Web of Science and PubMed databases from 1995 to 2018.

Results According to ITM, RIM is mostly similar to a kind of aphthous oral ulcers called Ghola, both of which have the same treatment. For RIM treatment, various strategies for lifestyle modification have been recommended. Furthermore, considering that heat and dryness are the primary causes of RIM occurrence, the plants that cause damp feeling and produce moisture and maintain tissue integrity throughout the body and mouth can be used locally and orally for the prevention and treatment of RIM based on their anti-inflammatory, antioxidant and antibiotic properties.

Conclusion Due to different viewpoints of ITM on health and disease, lifestyle modification and herbal remedies along with therapeutic measures can be effective in controlling RIM.

Extended Abstract

1. Introduction

The prevalence of cancer is rapidly increasing all over the world. Head and neck tumors account for 4% of all malignant cancers [1]. In the United States, about 100000 new cases of head and neck cancers are diagnosed every year [2]. There are many different therapeutic modalities for the control and treatment of these cancers, one of the most important of which is radiotherapy [3]. Radiation therapy concomitant with chemotherapy can destroy cancer cells by interfering with cell division and reducing cellular half-life [4].

Combined chemotherapy and radiotherapy have the greatest therapeutic effect on the patient, but complications such as oral mucositis are common in these treatments. The incidence of mucositis due to conventional chemotherapy is

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about 40%, while in severe chemotherapy, it is about 75%, and in head and neck radiotherapy is about 30%-60%. For combined chemotherapy and radiotherapy, its prevalence is 90% [5]. Different interventions have been recommended for the prevention and treatment of radiotherapy-induced mucositis [11, 7].

These interventions mostly are supportive measures such as oral health, nutritional support, salivary status improvement, pain relief, and local anesthetics (e.g. lidocaine, magnesium with antacid and diphenhydramine, sucralfate), ice sucking, growth hormone, and steroidal and nonsteroidal anti-inflam-

Table 1. Characteristics of radiotherapy-induced mucositis based on Iranian traditional medicine and modern medicine

Lesion	Color	Depth of Involvement and Odor	With/ Without Membrane	Severity of Pain	Extent of Spread	Associated Symptoms	Causes
Radiation-induced acute mucositis	White or red	Involvement of the skin surface, red and odorless	With false membrane	Moderate to severe	From mouth to the bottom of the esophagus	Dryness, reduced saliva and impaired sense of taste	Heat and dryness caused by radiation therapy, salivary gland damage and physical injury
Basvar blister	White, red or black	Involvement of the skin surface and odorless	Without membrane	Moderate to severe	Mouth	Warm nose or stomach	Acute blooding, warm nose, or warm stomach
Small purulent blisters	Red	Involvement of the skin surface, non-stinky, and odorless	Without membrane	Severe	Mouth	Red purulent blisters	Blister when becoming purulent
Damavi aphthous ulcer	Red	Involvement of the skin surface, non-stinky, and odorless	Without membrane	Severe	From mouth to esophagus and stomach	Warmth, redness and a swollen membrane	Acute blooding
Balghami aphthous ulcer	White	Involvement of the skin surface, non-stinky, and odorless	With swollen membrane	Mild	From mouth to esophagus and stomach	Like painless swelling	Due to the concentration and heat of the heat, the salt moisture salt the balgham remains below the skin
Safravi aphthous ulcer	Yellow	Involvement of the skin surface, non-stinky, and odorless	Without membrane	Severe	From mouth to esophagus and stomach	Severe inflammation and bitterness of the mouth	Safravi blooding
Saudavi aphthous ulcer	Black	Involvement of the skin surface, non-stinky, and odorless	Without membrane	Very severe	Wide and deep, from mouth to esophagus and stomach	Dry mouth, black tongue	Acute burning Sauda
Phagedenic ulcer	Like aphthous ulcer	Involvement of the skin surface, non-stinky, and odorless	Without membrane	Very severe	Wide and deep, from mouth to esophagus and stomach	High decay, rapid release and bad odor	Sputum from the nose or stomach

matory drugs, cryotherapy, palifermin, low-level laser therapy, morphine and benzydamine mouthwash [7, 9, 11-13].

The purpose of this study is to compare the radiotherapy-induced mucositis oral ulcers in Iranian traditional medicine and modern medicine. We also review the lifestyle and medications (like mouthwash) recommended by Iranian traditional medicine to treat and prevent mucositis.

2. Materials and Methods

This is a review study. We used all the authentic books of Iranian traditional medicine that were written in Persian or Arabic from the 2nd to 14th centuries, including Canon, Exir-e-Azam, Tibbe-Akbari, Zakhireye Khwarazmshahi, Al-Hawi, Khulasat Al-Tajarob, Sharh Al-Asbab Wa Al-Alamat, Makhzan ul Adviya, and Khulasat ul-Hikmat that mentioned oral diseases. Noor Digital Library was used to study oral ulcers and oral diseases with the present ulcer. The search in these books was done with the keywords of "Dahan" (mouth), "fam" (mouth), "ghala/garhe" (wound), and "varam" (swelling). We also searched PubMed, Web of Science, and Scopus databases using keywords "radiation-induced oral mucositis" and "traditional medicine" for papers published from 1995 to 2018.

3. Results

The pathogenesis of radiotherapy-induced oral mucositis is still unclear. There are five stages involved in the development and recovery of oral mucositis: the inflammatory onset, early epithelial injury, developmental stage, ulcerative stage, and subsequent healing. Each stage results from the direct effect of radiotherapy on the epithelium and the response to cytokines considering the patient's oral bacterial flora status. The radiation on the mucous membrane of the mouth damages the DNA and mucous membrane and results in the release of oxygen free radicals. From the perspective of Iranian traditional medicine, oral ulcers are categorized based on color, depth, odor, pain severity, with/without membrane, the extent of spread, associated symptoms, and their possible causes. Table 1 presents this classification as well as the various characteristics of radiotherapy-induced mucositis.

Based on Iranian traditional medicine, characteristics of radiotherapy-induced mucositis are mostly similar to damavi (bloody) aphthous ulcer and small purulent blisters. Both of these lesions have the same treatment. Various strategies have been recommended for lifestyle modification to prevent and treat these wounds. Because heat, warmth, and dryness can cause mucositis, certain plants that can create cold and wet temperament and maintain tissue integrity throughout the body and mouth can be used topically and orally for these lesions. These medications can prevent and treat mucositis with their anti-inflammatory, antioxidant and antibiotic properties.

4. Discussion

Given the different views of Iranian traditional medicine on health and disease and the results of various studies, lifestyle modification along with therapeutic measures can be helpful in the treatment of oral mucositis induced by head and neck radiotherapy. One of the limitations of the current study is the lack of studies on therapies for oral mucositis. Also, less attention has been paid to the prevention and treatment of this complication in Iranian traditional medicine. Therefore, it is recommended that various studies be conducted on the efficacy of oral medications and methods mentioned in Iranian traditional medicine resources for the treatment of oral mucositis.

Ethical Considerations

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Authors' contributions

All authors had equally contributed in preparing this article.

Conflicts of interest

The authors declared no conflict of interest.

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