The role of biotics as a therapeutic strategy for oral mucositis - a systematic review

Introduction

Oral mucositis is a commonly encountered adverse effect of cancer treatments (1) which significantly impairs patients’ nutrition and quality of life due to intense pain (2). The development of oral mucositis is a multifactorial and intricate process involving a complex interplay between various biological pathways and interactions between cancer therapy and oral tissues (3). Although the severity and incidence of oral mucositis may vary among patients, a mean incidence of approximately 80% has been reported (4). Furthermore, patients suffering from oral mucositis present a higher risk of developing infections and higher mortality rates compared to those without it (5).

Unfortunately, no effective approach to prevent or treat oral mucositis has been developed yet (6). It is also recognized that modifications in the oral microbiome can have an impact on the onset and severity of oral mucositis. Nevertheless, the manipulation of the oral microbiome using biotics such as probiotics, prebiotics, postbiotics, and symbiotics has emerged as an alternative treatment or co-adjuvant option.

Aim

This systematic review aimed to assess the effectiveness of biotics used as a therapeutic strategy for the management of oral mucositis.

Methodology

Clinical studies

Lactobacillus brevis CD2

Producing high levels of arginine deiminase and sphingomyelinase (7) → reduction in the levels of some of the inflammatory factors.

- De Sanctis, Belgeisa et al. 2009 (13).
- Sharma, Balh et al. 2012 (17).

Lactobacillus casei

Decreasing inflammatory factors (TNF-α and IL-6) (8).

- Christian, Subhanraj et al. 2020 (15).

Pre-clinical studies

Lactobacillus lactis genetically modified

Possible cytotoxic effects against human cancer cell lines (10) and anti-inflammatory properties and capacity in preventing 5-FU-induced gut dysbiosis (11).

- Caluwaerts, Vandendriessche et al. 2010 (18).

Streptococcus salivarius K12

- Modulating the oral microbiome.
- Reversing the abundance of anaerobic bacteria and leukocytosis.
- Increasing the thickness of the tongue mucosa and the density of basal cells.
- Enhancing basal cell proliferation and attenuating apoptosis.

- Wang, Li et al. 2021 (19).

Lactobacillus reuteri

- Reducing pro-inflammatory cytokine response.
- Increasing key antioxidant genes.

Note: associated with reduced gingival inflammation and a decrease in pathogens associated with periodontitis (2). In cases of patients with oral mucositis, it is not recommended to use this strain the same way as probiotics.

- Gupta, Fernreira et al. 2020 (20).

References

The findings of this systematic review suggest that probiotic supplementation could potentially reduce the incidence of therapy-induced oral mucositis or alleviate its symptoms in chemotherapy or radiotherapy patients. However, the available evidence is narrow and marred by significant heterogeneity across studies.