

Influence of Periodontitis on the Experience of Oral Mucositis in Cancer Patients Undergoing Head and Neck Radiotherapy

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Abstract

Background and aim: Virtually all patients who receive head and neck radiotherapy develop some degree of oral mucositis. Severe oral mucositis may necessitate an interruption of the course of radiotherapy and thus can serve as a dose-limiting factor. Periodontitis is a host-driven inflammatory response to a pathogenic bacterial biofilm in the subgingival environment, resulting in the progressive destruction of the tissues that support the teeth, specifically the gingiva, periodontal ligament, and alveolar bone. This disease affects more than 50% of the population. Considering that radiation-induced oral mucositis and periodontitis are both characterised by the continuing presence of systemic inflammation, they may be associated through a primed inflammatory response as proposed by the “two-hit” model. Alternatively, both conditions may be correlated as they represent a dysregulation of the inflammatory response. To date, no studies have looked into the association between these conditions. The aim of this study is to determine whether the severity of oral mucositis is associated with the severity of periodontitis in cancer patients undergoing head and neck radiotherapy.

Materials and methods: Eighty-five consecutive patients seeking dental clearance prior to head and neck radiotherapy were assessed for their eligibility for participation in the study. Forty-one patients met the inclusion criteria. The severity of oral mucositis was measured according to the WHO system. The severity of periodontitis was assessed clinically and radiographically. Gingival crevicular fluid was sampled and levels of eight cytokines were determined using a multiplexed bead immunoassay. The association between radiation-induced oral mucositis and periodontitis was analysed using logistic and linear regression, and two-way contingency tables.

Results: The mean age of the whole study population was 63.3 ± 11.0 years (range 44.8 to 82.9 years). The majority of patients were male (73%). The primary tumour site was most commonly the oral cavity and salivary gland (45%), followed by the pharynx (33%) and larynx and others (21%). The duration of radiotherapy was significantly associated with the severity of oral mucositis (p -value=0.038). A trend towards increased pocket depth and clinical attachment levels was noted in patients with oral mucositis grades 1-4, but this was not statistically significant.

Conclusion: Patients seeking dental clearance prior to head and neck radiotherapy at the Special Needs Unit, Adelaide Dental Hospital, were a good representation of the general head and neck cancer population. The resultant lack of association between radiation-induced oral mucositis and periodontitis was attributed to the extraction of teeth prior to periodontal examination, lack of uniformity of cancer treatment regimens and lack of statistical power. Hence, larger studies with a tighter inclusion criteria (e.g. similar radiotherapy protocol, without chemotherapy or surgery) are now required to follow-up on these preliminary findings.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Dr Arlene KHAW Bee Hong

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