

An Exploration of the Periodontal Disease-Cancer Association

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Abstract

Previous studies have recorded that long-term inflammation promotes tumor development, growth and progression. It has been confirmed that malignancies can arise from infection and inflammation areas as a part of the normal response of the host. This observation suggests that chronic inflammation is a risk or a prerequisite factor for the development of a number of malignancies in organs such as the liver, colon, stomach, urinary bladder, uterine cervix, ovaries and lung. An association of periodontal disease (PD) with cancer was proposed, based on the fact that inflammation is a major factor that links PD to cancer. The highest cancer incidence in cases with chronic inflammation was the basis for investigating the possibility of correlation with periodontitis.

Keywords: *Periodontal Disease; Cancer; Inflammation*

Previous epidemiological and laboratory studies have recorded that long-term inflammation promotes tumor development, growth and progression [1]. It has also been proposed that malignancies can arise from infection and inflammation areas as a part of the normal immunological response. This observation suggests that chronic inflammation is a risk or a prerequisite factor for the development of malignancies in organs such as the liver, colon, stomach, urinary bladder, uterine cervix, ovaries and lung [2,3].

Recently, the association of periodontal disease (PD) with cancer was proposed, based on the fact that inflammation is a major factor that links PD to cancer. The highest cancer incidence in cases with chronic inflammation was the basis for investigating the possibility of correlation with periodontitis [4].

PD as a chronic inflammation increases the risk for several types of cancer [4-10]. The inflammatory response to periodontal infection extends beyond the oral cavity and leads to increased levels of circulating inflammatory markers [11]. The induction of systemic inflammation that resulting from PD may therefore provide a pathway through the disease and increases the risk of various types of cancer development. Other mechanisms that have been proposed are the deflection of the immune system and the production of carcinogenic products by periodontal tissues pathogens [12]. Alternatively, underlying genetic factors may increase the susceptibility to both conditions or may alter the relationship of environmental risk factors, such as smoking, with PD and cancer. The role of the common genetic risk factors between the two conditions, remains unchecked, whereas it is unknown if the systemic inflammation, blood pathogenic invasion or the immune response to periodontal infection could affect the overall risk of developing cancer at various locations [13].

Case-control studies have recorded strong relationships between tooth loss and oral cancer even after controlling for potential confounders such as smoking and alcohol consumption [14,15].

The follow-up of NHANES III patients demonstrated that periodontitis was associated with an increased respiratory and gastrointestinal cancer mortality [16].

Recently, it was found that PD was associated with a 15% increased risk for all types of cancer. In particular, increased risks for cancer of the digestive, colorectal, pancreas, prostate and uterus, associated with PD, were recorded. That relationship was absent in monozygotic but was remained in dizygotic twins and the conclusion was that common genetic risk factors could partly interpret the relationship between PD and cancer, however it was considered that the contribution of genetic factors was limited [17].

It has also been reported that severe PD may be associated with Cytomegalovirus (CMV) or Epstein-Barr virus (EBV1) infection with mixed results. EBV has been associated with cancer, including lymphoma and nasopharyngeal carcinoma [18].

PD has been considered that increases the risk of gastric non-cardiac adenocarcinoma through changes in oral bacterial flora and due to the subsequent chronic systemic inflammation [19,20]. Various orally pathogens have been associated with chronic systemic inflammation which in turn has also been associated with an increased risk of gastric cancer [21,22].

Tooth loss or poor oral hygiene as markers of periodontal tissues condition have been associated with a number of cancers [23]. In a prospective study with a follow-up time of 16 years was found that people with PD and loss of molars showed an increased risk of death from neoplasms [24]. Tooth loss is caused by dental caries and PD, however the contribution rate from each condition depends on age and other factors. Tooth loss in elderly people could be attributed to chronic PD whereas in younger ages, due to caries [25]. Therefore, whereas the loss of teeth can be an indicator of PD, the relationship between tooth loss and PD is not always valid. Those differences could be attributed to variations in the study design, patients' identification, interpretation of findings and the inflammatory condition of the periodontal tissue.

In conclusion, despite any contradictory views, periodontitis has been recognized as a potential risk factor for respiratory, gastrointestinal and pancreatic cancer and possibly for others organs. It is obvious that exists an urgent need for further investigation.

Conflict of Interest

None.

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