ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PERIODONTAL DISEASE AND CANCER – A REVIEW

Dental Science

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ABSTRACT

This article is mainly to focus that is a person with high risk of cancer for people with periodontal disease. Research findings show that patients' risk of developing cancer may be increased by periodontal disease and tooth loss. Inflammation is a key feature in many chronic diseases such as periodontal disease,[1] atherosclerosis [2]but, also in cancer[3]. If there is an acute inflammation it is beneficial for the host by causing elimination of pathogens and it will promote wound healing. But if the problem does not resolved an the infection becomes chronic in nature then the process may even facilitate malignant transformation of cells leading to subsequent progression of cancer[4]. This review article intends to throw light on association between periodontal health an carcinogenesis

KEYWORDS

Periodontal disease, oral infection, cancer

INTRODUCTION

Periodontal disease is characterised by chronic infection and inflammation in periodontal tissues leading to the destruction of the bone surrounding the teeth[5]. Prevalence of Periodontitis occur based on tissue destruction and alveolar bone loss happen[6,7]. The disease may take decades to develop and leads to tooth loss if left untreated.There are various studies that support cancer risk and severe periodontitis . Prevalence of periodontitis is based on geographic and characterstics of people[8,9]Risk factors of periodontitis include gender[6], tobacco,diabetes,nutrition[10], Body Mass index(BMI)[11], socioeconomic status, and access to dental care[12]

Infections caused by periodontal pathogens like porphyromonas gingivalis,like porphyromonas gingivalis,Actinomycetemomitans, Treponema denticola and Tanerella forthysus are contributed for periodontitis. Evidence support that there is a strong relation between systemic conditions and periodontal health. Systemic conditions such as cardiovasular disease[13], diabetes mellitus, preterm low birth weight, osteoporosis, respiratory disease and systemic infections are related to periodontitis. There is noticeable increase in incidence of periodontal disease with advancing age and tooth loss at old age is mostly due to chronic periodontal infection[14]

Chronic inflammation increases the chance of severe cancers and inflammation in some particulars results in the breakdown of connective tissue that surrounds the teeth[15]. Variations in various markers of inflammation is seen with periodontitis for example there is increase in total number of leukocytes and Creactive proteins and decreasing number of red bloodbcells and levels of haemoglobin[16]. Periodontitis at a younger age is a higher disease vulnerability[17]. Systemic vascular injury, bacterial endotoxins and metastatic infections are thought to be responsible for this relation. Poor glycemic control is also another predisposing factor to periodontal disease and advanced glycation(AGEs) are formed as a result of hyperlipidemia or hyperglycemia and results in accumulation of collegen in periodontal capillary in periodontal capillary basement membrane which leads to membrane thickening and decreasing in tissue perfusion and oxygenation

These changes may possibly accounts for increase in susceptibility to infections, vascular changes and impaired healing which is commonly related to diabetes mellitus[18]. Type 2 diabetes mellitus is a greater risk for periodontal disease progression[19].

Genetic risk factors may also be risk factors. Many viruses like Human cytomegalo virus (HCMV) and Epstein barvirus (EBV), two members of herpes viridae family may also mediate oncogenic growth. Herpes viruses are transmitted from person to person during initial stages of primary infection. HCMV is the most common life threatening infections in HIV patients, EBV is the causative agent of oncogenic growth. Saliva is the main source of its transmission and it resides in marginal and apical periodontitis. Periodontal therapy reduces the EBV20,21. Evidence suggests that there is a significant genetic component that increases the risk of periodontal disease and canceGenetic risk factors may also be risk factors. Many viruses like Human cytomegalo virus (HCMV) and Epstein barvirus (EBV), two members of herpes viridae family . The genetic factors in periodontal disease are well recognized and genetic susceptibility test is available.[22] In summary extensive verifications support an association between chronic infections and increased risk of cancer and tooth loss.

STUDIES CONDUCTED TO INTERLINK PERIODONTAL DISEASE AND CANCER

A study done by Mine Tezal represents an association between tongue cancer and periodontal diseases after adjusting other factors including effects of age, smoking status and the number of teeth. Study reveals 5.23- fold increase in the risk of tongue cancer with 1mm alveolar bone loss. This study excludes the association of tongue cancer with other oral diseases like caries, root canal filling etc.[23]

Hujoel (2003), studied the association between periodontitis and various types of cancer. Data were available on 11,328 adults (25-74 years), who were diagnosed as dentate individuals with either periodontitis ($n = 2092$), gingivitis ($n = 2603$), a healthy periodontium ($n = 2,671$) or as individuals without teeth (edentulous n = 3,962) at the beginning of the follow-up. The main outcome measure was fatal cancer, as ascertained from the death certificates. Of the different cancer types, lung cancer demonstrated the strongest association.[24]

Study donein Beijing for dentition and risk of oral cancer. The 404 matched cases and hospital-based controls completed a questionnaire and conducted an oral examination, which included recording of missing teeth and presence of gingivitis or periodontal disease. Analyses were stratified by gender, for males, a 2-3 fold increase in risk of oral cancer was observed for any tooth loss with and without tooth replacement and a 5-8 fold increase in risk for females.[25] Study done

byMine Tezal represented relation of head and neck squamous cell carcinoma with periodontal disease. This association was so much obvious that each millimeter alveolar bone loss was associated with greater than 4 fold increased risk of head and neck squamous cell carcinoma.[26]In an another study conducted by Mine Tezal found increased incidence of oral precancerous lesion or tumors with greater than 1.5mm CAL (Clinical attachment loss). Abnet et al conducted a study which shows elevated risk of esophageal squamous cell carcinoma, gastric cardiac adenocarcinoma, or gastric non-cardia adenocarcinoma in relation to tooth loss[27.] Michaud et al reported an association between tooth loss and pancreatic cancer. 1n 16 years of follow-up he diagnosed 216 patients with pancreatic cancer[28.]

Hujeol et al found association between breast cancerand periodontal disease. Hiraki has found no association between breast cancer and tooth loss. Michaud et al conducted a cohort study in large group of people and found no link between tooth loss and esophageal cancer[29.]

CONCLUSION

These studies done by various authors throw light on the fact that compromised oral health may prove a risk factor for carcinogenesis.

REFERENCES

1. S.Airila-Mansson, B.Soder, K.Kari, J.H. Meurman, "Influence of combinations of bacteria on the levels of prostaglandin E2, interleukin-1beta, and granulocyte elastase in gingival crevicular fluid and on the severity of periodontal disease", J Periodontol, vol. 77(6), pp. 1025.1031, Jun. 2006.
2. L.M. Coussens, Z.Werb, "Inflammation and cancer", Nature, vol. 420(6917), pp. 860-867, Dec. 2002.
3. D.B. Lowe, W.J. Storkus, "Chronic inflammation and immunologic-based constraints in malignant disease",Immunotherapy, vol. 3(10), pp. 1265-1274, Oct. 2011
4. P. Allavena, C. Garlanda, M.G. Borrello, A. Sica, A. Mantovani, "Pathways connecting inflammation and cancer", Curr Opin Genet Dev, vol. 18(1), pp. 3-10, Feb. 2008
5. Zheng TZ, Boyle P, Hu HF, et al. Dentition, oral hygiene, and risk of oralcancer: a case-control study in Beijing, People's Republic of China. CancerCauses Control 1990; 1:235-241
6. Irfan UM, Dawson DV, Bissada NF. Epidemiology of periodontal disease: a review and clinical perspectives. J Int Acad Periodontol . 2001;3:14–21.
7. Michaud DS, Joshipura K, Giovannucci E, Fuchs CS. A prospective study of periodontal disease and pancreatic cancer in US male health professionals. J Natl Cancer Inst. 2007;99:171.
8. Ekel PI, Dye BA, Wei L, Thornton-Evans GO, Genco FJ. Prevalence of periodontitis in adults in the United States: 2009 and 2010. J Dent Res2012; 91:914. Originally published online Aug. 30, 2012.
9. Abir Al Ghuzlan, Bernard Caillou, Martin Schlumberger. Institut GustaveRoussy and University Paris XI-Sud. Lancet 2008; Vol. 9.
10. Pihlstrom BL, Michalowicz BS, Johnson NW. Periodontal diseases. Lancet. 2005; 36:1809–20.
11. Tonetti M, D'Aiuto F, Nibali L, et al. Treatment of periodontitis and endothelial function. N Engl J Med 2007; 356:911-920.
12. Tezal M, Grossi SG, Genco RJ. Is periodontitis associated with oralneoplasms? Journal of Periodontology 2005; 76:406-410
13. Wactawski-Wende J. Periodontal diseases and osteoporosis: association and mechanisms. Ann Periodontol. 2001;6:197–208.
14. Meyer MS, Joshipura K, Giovannucci E et al. A review of relationship between Tooth Loss, Periodontal disease and Cancer. 2008; 19: 895-907.
15. Arora M, Weuve J, Fall K et al. An exploration of shared genetic risk factors between periodontal disease and Cancer: A prospective Co-Twin Study. American Journal of Epidemiology, 2009;171: 253-59.
16. Loose BG. Systemic markers of inflammation in periodontitis.J Periodontal, 2005.
17. Dietrich T, Jimenez M, Krall Kaye EA et al. Age-dependent associations between chronic periodontitis/edentulism and risk of coronary heart disease. Circulation, 2008; 117: 1668-74.
18. Acharya AB, Satyanarayan A, Thakur SL. Status of association studies linking diabetes mellitus and periodontal disease in India. J diabetes Dev Ctries, 2010; 30: 69-74.
19. Chavarry NG, Vettore MV, Sansone C et al. The relationship between diabetes mellitus and destructive periodontal disease: a meta-analysis. Oral Health Prev Dent, 2009; 7: 107-27.
20. Slots J, Saygun I, Sabeti M et al. Epstein-Barr virus in oral diseases. J Periodontal, 2006; 41: 235-44.
21. Saygun I, Kubar A, Ozdemir A et al Periodontitis lesions are a source of salivary cytomegalovirus and Epstein-Barr virus. J Periodontal, 2005; 40: 187-91.
22. Khalil J. Genetic test and periodontal disease. Lik Sprava, 2010; 1-2: 91-95.
23. Tezal M, Sullivan MA, Reid ME et al. Chronic periodontitis and the risk of tongue cancer. Arch Otolaryngol Head Neck Surg, 2007; 133: 450-54.
24. Hujoel PP, Drangsholt M, Spiekerman C, Weiss NS. An exploration of the periodontitis-cancer association. Ann Epidemiol 2003;13:312-6.
25. Meyer MS, Joshipura K, Giovannucci E et al. A review of relationship between Tooth Loss, Periodontal disease and Cancer. 2008; 19: 895-907.
26. Shi D, Meng H, Xu L et al. Systemic inflammation markers in patients with aggressive periodontitis: a pilot study. J Periodontol, 2008; 79: 2340-46.
27. Tezal M, Sullivan MA, Hyland A et al. Chronic Periodontitis and the Incidence of Head and Neck Squamous Cell Carcinoma. Cancer Epidemiol Biomakers Prev, 2009; 18: 2406-12.
28. Michaud DS, Joshipura K, Giovannucci E et al. A prospective study of periodontal disease and pancreatic cancer in US male health professionals. J Natl Cancer Inst, 2007; 99: 171-75.
29. Fitzpatrick SG, Katz J. The association between periodontal disease and cancer. Journal of Dentistry, 2010; 38: 83-95