



ASSESSMENT OF RELATION BETWEEN PERIODONTAL DISEASE AND MACULAR DEGENERATION

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ABSTRACT

Background and Aim: Oral pathogens have been identified in bioptic specimens from Age-Related Macular Degeneration (ARMD) patients, and alveolar bone loss has been related to ARMD. Periodontal diseases are leading cause of tooth loss. The present study was conducted to assess relation between periodontal disease and macular degeneration. **Material and Methods:** Present study was performed in 200 patients at the department of Periodontics. Demographic data was recorded. Community periodontal index (CPI) probe was used for oral examination. AMD was diagnosed based on criteria such as presence of soft indistinct drusen or reticular drusen and presence of hard or soft distinct drusen with pigmentary abnormalities in the absence of late AMD. **Results:** Out of 200 patients, males were 115 and females were 85. One Hundred and Twenty two patients had periodontal diseases (61%) and 17 (8.5%) had AMD. Among AMD patients, 11 had habit of smoking, 9 were hypertensive, 13 had anemia and 6 had cardiovascular disease. Serum HDL level was 54.5 mg/dl, serum ferritin level was 105.1 ng/ml and BMI was 27.9 Kg/m². The difference between AMD and non AMD was significant ($P < 0.05$). **Conclusion:** AMD patients had severe periodontal diseases as compared to non AMD patients. An understanding of the influence of oral health on AMD may aid in limiting the disease's visual manifestations in the growing elderly population.

KEYWORDS

Age-Related Macular Degeneration Community Periodontal Index, Periodontal Diseases, Smoking

INTRODUCTION

Age-Related Macular Degeneration (ARMD) is a progressive degenerative vision-threatening ocular disease in the elderly. It represents the late stage of a group of degenerative changes in the macula, the central region of the retina and the choroid, collectively called age-related maculopathy.¹ ARMD is characterized by the appearance of drusen in the macula, followed by geographic atrophy or by choroidal neovascularization, and affects, primarily, the retinal pigment epithelial cells and, secondarily, the photoreceptors, leading to disturbances or partial loss of central vision and legal blindness.² There are two major forms of the disease: atrophic or 'dry' macular degeneration and exudative or 'wet' ARMD.³ The occurrence of proliferation of abnormal new blood vessels, or formation of a choroidal neovascular membrane are key features. Atrophic form is evident in most of patients of ARMD. It is commonly evident with drusen and retinal pigment epithelial (RPE) atrophic changes of the central macula. It is seen that severe central visual loss is observed in patients older than 60 years of age with exudative form of ARMD.

Periodontal diseases (PDs) are main leading reason for destruction of tooth-supporting tissues due to unsuitable response against pathogenic bacteria species by host. It has been shown that common risk factors are genetic and environmental.⁴ PDs are characterized by the presence of gingival bleeding, gingival inflammation, gingival recessions, dental mobility, and loss of clinical attachment leading to presence of periodontal pockets and alveolar bone resorption.⁵ Recently, many researchers have reported that periodontal disease may be associated with various systemic diseases, comprising pulmonary and cardiovascular ones along with diabetes, albuminuria, preterm birth, chronic obstructive, obesity, as well as with solid tumors, including colorectal cancer, and that periodontal pathogens may act either directly, infiltrating periodontal damaged tissue, entering systemic circulation, and leading to an inflammatory response in other organs, or indirectly via endotoxin production. In particular, periodontal

disease has been found associated with atherosclerosis, as well as atherosclerosis with ARMD¹⁰. These findings may suggest the existence of a possible etiopathogenic link between ARMD and periodontal disease.

Since ARMD is one of the most common causes of blindness in elderly populations in industrialized countries^{11,12}, prevalence is predicted to continuously increase because of the aging population¹³, etiopathogenesis identification and risk factors management of this condition appear crucial. Therefore, highlighting a possible role a periodontal disease in ARMD etiopathogenesis may, beyond improving knowledge about oral and general health inter-relationship, contribute to a multi-disciplinary integrated approach to ARMD patients. The present study was conducted to assess relation between periodontal disease and macular degeneration.

MATERIAL AND METHODS

Present study was performed in 200 patients at the department of Periodontics. Demographic data was recorded. Eye examination was done by ophthalmologist. We obtained nonmydriatic 45° color fundus photographs. Community periodontal index (CPI) probe was used for oral examination. AMD was diagnosed based on criteria such as presence of soft indistinct drusen or reticular drusen and presence of hard or soft distinct drusen with pigmentary abnormalities in the absence of late AMD. Size, appearance and edge sharpness helped in classification of Drusen. Retinal pigmentary abnormalities were graded as hyper- or hypopigmentation of the retinal pigment epithelium (RPE). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

RESULTS

Table 1 shows that out of 200 patients, males were 115 and females were 85. Table 2 shows that 122 patients had periodontal diseases (61%) and 17 (8.5%) had AMD. Among AMD patients, 11 had habit of smoking, 9 were hypertensive, 13 had anemia and 6 had cardiovascular

disease. Serum HDL level was 54.5 mg/dl, serum ferritin level was 105.1 ng/ml and BMI was 27.9 Kg/m². AMD patients had severe periodontal diseases in 8, moderate in 4 and 2 in mild, non AMD had 1 moderate and 2 in severe periodontal diseases. The difference between AMD and non AMD was significant ($P < 0.05$).

Table 1: Gender wise Distribution of Study Participants

Gender	Number	Percentage (%)
Male	115	57.5
Female	85	42.5
Total	200	100

Table 2: Prevalence of periodontal diseases and AMD

Variable	Number	Percentage (%)
Periodontal Disease	122	61
AMD	17	8.5

Table 3: Comparison of parameters in patients with and without AMD

Variables	AMD	Without AMD	P value
Smoking	11	6	0.02*
Hypertension	9	8	0.8
Anemia	13	4	0.002*
Cardiovascular disease	6	11	0.03*
Serum HDL	54.5	45.5	0.04*
Serum ferritin	105.1	93.2	0.001*
BMI	27.9	24.1	0.009*
Periodontal disease			
Mild	2	0	0.008*
Moderate	4	1	
Severe	8	2	

* indicates statistically significance at $p \leq 0.05$

DISCUSSION

Periodontal infections can cause molecular mimicry between foreign and self peptides to produce cross activation of autoreactive B cells and T cells that can lead to tissue pathology or autoimmunity in atherosclerotic vascular disease.^{14,15} Similar molecular mimicry mechanisms have been proposed as a potential initial event triggering an immune response that leads to an inflammatory response, which may play a part in the pathogenesis of AMD.¹⁶ Findings from this study support this hypothesis linking PD with AMD in certain age groups.^{17,18}

The possible association between periodontitis and ARMD in humans was investigated in the present study. There are different risk factors such as light skin pigmentation, family history, advancing age, hyperopia, smoking, female gender, hypertension, hypercholesterolemia, and cardiovascular disease.^{19,20} The present study was conducted to assess relation between periodontal disease and macular degeneration.

In present study, out of 200 patients, males were 115 and females were 85. We found that 122 patients had periodontal diseases (61%) and 17 (8.5%) had AMD. Results showed no correlation of AMD with mild Perio, but there was an association between those with severe Perio and AMD and mostly in those that were in the younger group.²¹

We found that among AMD patients, 11 had habit of smoking, 9 were hypertensive, 13 had anemia and 6 had cardiovascular disease. Serum HDL level was 54.5 mg/dl, serum ferritin level was 105.1 ng/ml and BMI was 27.9 Kg/m². AMD patients had severe periodontal diseases in 8, moderate in 4 and 2 in mild, non AMD had 1 moderate and 2 in severe periodontal diseases. The difference between AMD and non AMD was significant ($P < 0.05$). Similar findings were observed by Wagley et al²² and Brzozowska and Puchalska-Niedbal²³. Karesvuo et al²⁴ reported that persons with AMD had fewer teeth and more alveolar bone loss compared with participants who did not have AMD. In contrast with our finding, Brzozowska et al²⁵ reported a high prevalence of dental and periodontal lesions in ARMD patients and suggested a possible association between periodontal conditions and susceptibility to ARMD onset.

There was no significant difference in the proportion of participants with PD between those with and without AMD. It was seen that subjects with AMD in the middle age group had more any PD than those without AMD thus PD was not significantly associated with

AMD. However, subjects with severe PD in the middle age group were 1.61 times more likely to have AMD.

CONCLUSION

AMD patients had severe periodontal diseases as compared to non AMD patients. An understanding of the influence of oral health on AMD may aid in limiting the disease's visual manifestations in the growing elderly population. Improving oral care to reduce PD warrants further study, as PD prevention may also lead to reduced risk for other age-related diseases.

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