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Periodontal status of HIV-positive patients

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Abstract

Objective: To assess the periodontal status of HIV positive individuals and to compare it with age-and gender-matched controls.

Materials and Methods: The cross-sectional study comprised fifty-two HIV positive individuals and fifty-two controls. OHI-S and PI were recorded by a single pre-trained and pre-calibrated examiner.

Results: Based on antiretroviral therapy use, mean OHI-S was higher among HIV positive females undergoing therapy. A significant gender difference was observed in the PI score among those on antiretroviral therapy, with females having a lower score ($p = 0.04$). Also, significant gender difference was observed in the mean PI score among HIV positive individuals, with males having a higher score.

Conclusion: There was a significant difference in the overall mean OHI-S score among HIV positive individuals and controls ($p = 0.03$). However, no significant difference was observed when the overall PI score was calculated for both groups. ($p = 0.95$).

Key words: *HIV positive, periodontal status, oral hygiene.*

Introduction

The occurrence of a distinctive form of periodontal disease as a manifestation of HIV infection was first reported in 1987, when Winkler and Murray described an unusual form of gingivitis occurring in HIV seropositive individuals which presented as a distinct erythematous band at the marginal gingiva and was associated with petechiae (1). Reports of periodontal disease prevalence among seropositive subjects vary widely. The reported prevalence of HIV-associated periodontal diseases in HIV seropositive subjects has ranged from 0% to 50% affected by HIV-G and from 0% to 22% by HIV-P. Although, some studies have related the progression of

HIV infection with the presence of gingivitis (2,3) and severity of periodontal destruction (4), the more recent studies indicate that the association may not be strong (5-8).

Thus, the relationship of periodontal health to HIV infection is an unresolved topic. These contradictory results could be because of the diversity in study design, the clinical criteria used to identify periodontal disease and lack of control groups.

Therefore, the present study was designed to use objectively measurable clinical indicators to quantify the periodontal status in HIV infected individuals for better comparison. Thus, the aim was to test the hypothesis

that there is no significant difference in the periodontal status of HIV positive individuals with age and gender matched controls. The objectives of the present study were 1) to assess the periodontal status of HIV positive individuals and 2) to compare the periodontal status of HIV positive individuals with age-matched and gender-matched controls from the general population.

Materials and Methods

The cross-sectional study protocol was approved by the Institutional Research Ethics Committee and written informed consent was obtained from all participants. Fifty-two HIV-positive adult individuals, visiting for regular medical check up at Infectious Disease Cell at were included in the study. Their HIV status was tested by Enzyme Linked Immunosorbent Assay (ELISA) and was confirmed by Western Blot. The control group consisted of fifty-two healthy individuals with no oral complaints, randomly recruited from the general population, thereby eliminating the bias of including those seeking dental care and were matched to the HIV-positive group for age and gender distribution. In both groups participants were excluded if a) they could not tolerate oral examination b) had undergone recent dental treatment (within 3 weeks of the study) c) did not give consent. Clinical examination was carried out with the individual seated on a dental chair with adequate illumination. The examiner and recorder were trained and calibrated prior to the commencement of the study to ensure reliability of the indices used. A validation exercise was conducted during the study (re-examination of 10% of the subjects) to monitor examiner agreement and consistency during the course of the study. (Intraexaminer Kappa=0.89)

The oral hygiene status was assessed using Simplified Oral Hygiene Index (OHI-S) (9) were in only the six index teeth were employed. Full mouth Periodontal Index (PI) by Russel (10) was used to examine the periodontal status. Accordingly, all the gingival tissue circumscribing each tooth was assessed for gingival inflammation and periodontal involvement.

Statistical analysis of the data was done using Statistical Package for Social Sciences (SPSS) version 12. Chi-square test was used to compare between categorical variables. For comparison between the periodontal status of the two groups, Independent Mann Whitney U test was employed. Multiple group analysis was done using Kruskal Wallis and $p < 0.05$ was considered as statistically significant.

Results

Table 1 reveals the demographic details of the study population, the time of diagnosis, use and the duration of antiretroviral therapy among the HIV positive individuals. Majority of the HIV positive were on the basic regimen of antiretroviral therapy (59.6%) for more than 6 months duration (32.7%).

In HIV positive individuals, no statistically significant difference was observed in the mean OHI-S score between males and females or among males ($p=0.76$) or females ($p=0.44$) based on the duration from the time of diagnosis. However, males had a higher mean PI score as compared to females at 1-3 months duration from the time of diagnosis which was statistically significant ($p=0.04$). The mean OHI-S score based on the antiretroviral therapy use, revealed a statistically significant difference among HIV positive females, with those on

Table 1. Demographic details of the study population.

		HIV positive individuals	Controls
Gender	Males	30 (57.7%)	30 (57.7%)
	Females	22 (42.3 %)	22 (42.3 %)
Age (yrs)	21-30	11 (21.2 %)	16 (30.8 %)
	31-40	26 (50 %)	20 (38.5 %)
	41-50	11 (21.2 %)	12 (23.1 %)
	51-60	3 (5.7 %)	3 (5.7 %)
	≥ 61	1 (1.9 %)	1 (1.9 %)
Time of Diagnosis as HIV positive	1-3 months	13 (25 %)	-
	4-6 months	5 (9.6 %)	-
	>6 months	34 (65.4 %)	-
Antiretroviral Therapy Use	Yes	31 (59.6 %)	-
	No	21 (40.4 %)	-
Duration of Antiretroviral Therapy	1-3 months	9 (17.3%)	-
	4-6 months	5 (9.6%)	-
	>6 months	17 (32.7%)	-

antiretroviral therapy having a higher score ($p=0.03$). Based on the use and duration of antiretroviral therapy (more than 6 months), a significant gender difference was observed in the mean PI score, with females having a lower score (use- $p=0.04$; duration- $p=0.02$)

When the overall mean OHI-S and mean PI scores were calculated based on the duration of diagnosis, antiretroviral therapy and their duration of use, no significant difference was observed in the HIV positive group.

Among HIV positive individuals, the mean PI score revealed significant gender difference, with males having higher score ($p=0.04$). Comparison of the overall mean OHI-S score among HIV positive individuals and controls showed a significant difference ($p=0.03$). Nevertheless, no such significant difference was noticed when overall mean PI score was considered between both the groups. (Table 2)

Table 2. Comparison of the overall mean OHI-S score and mean PI score among HIV positive individuals and controls.

	HIV positive individuals	Controls	p value
	Mean Rank	Mean Rank	
OHI-S	58.61	46.39	0.03*
PI-S	52.66	52.34	0.95

Discussion

Periodontal diseases have long been associated with systemic diseases. Also, there are numerous references to HIV-related periodontal diseases in the literature which although, poorly substantiated have established that periodontal diseases are part of the expected range of HIV-associated conditions (11). In addition, several of the previous cross-sectional studies on the prevalence of the periodontal disease in HIV-infection lacked an adequate control group (6,7,12).

Therefore, the present study was designed not only to determine the periodontal status among HIV positive individuals but also to compare it with age-matched and gender-matched control group. The group of HIV positive recruited in this study were those visiting the medicine outpatient department for regular check-up and hence, were more representative of HIV positive patients than those reporting to a dental clinic with oral complaints.

A major purpose of this study was to quantify the periodontal status, as quantitative measures are more objective, and determine both severity and extent of periodontal disease. Thus, Simplified Oral Hygiene Index and Periodontal Index were recorded.

The Simplified Oral Hygiene Index by Greene et al. (9) provides a simple quantitative expression of oral cleanliness of the individuals. This index incorporates both oral debris and oral calculus, which are factors considered in oral cleanliness. It is a reasonably sensitive method for assessing oral hygiene in population groups.

The Periodontal Index by Russell (10) estimates the deeper periodontal disease by measuring the presence / absence of gingival inflammation, its severity, pocket formation and masticatory function. As it is a composite index, it records both reversible changes (due to gingivitis) and irreversible changes (tooth mobility) brought by deeper periodontal disease and therefore, measures the gradient of periodontal disease.

A significant difference between HIV positive individuals and controls was observed with respect to overall mean OHI-S score with HIV positives having higher score. This could be because of the impact of the disease on oral cleanliness. Nevertheless, no significant difference was noted with respect to the overall mean PI score. This finding contradicts the results obtained by Coates et al. (13) wherein the CPITN index was employed and the scores were lower among HIV positive patients as compared to the general population ($p=0.01$). Likewise, the work of Ranganathan et al. (14) on Indian patients revealed a statistically greater severity and extent of conventional periodontal breakdown in the patient cohort than in matched controls. These findings could be an overestimation, as CPITN index records only few selected teeth and in the present study a full mouth periodontal index was used.

Based on the antiretroviral therapy use, a significant difference ($p=0.03$) was observed in the mean OHI-S score among females, with those on therapy having a higher score compared to those not on therapy. Also, a significant difference in the mean PI score between males and females was noted among those on therapy. These higher scores can be attributed to the fact that antiretroviral drugs have oral side effects like dry mouth (15). These findings do not concur with the results of the study done by McKaig et al. (16) wherein HIV-associated periodontitis was significantly associated with HIV-antiretroviral therapy (OR=0.3,95% CI=0.1,0.8), with persons taking antiretrovirals being one-third as likely to have HIV-associated periodontitis as compared to those not managed by HIV-antiretroviral therapy.

Comparison of the mean PI score among HIV positive individuals based on the gender showed a significant gender difference with males having a higher score ($p=0.04$). This was similar to the findings by Martinez-Canut et al. (6) wherein only 2.3% females as compared to 13.8% males reported of advanced periodontitis. On the other hand, Klein et al. (17) reported that periodontal disease was significantly more severe among HIV positive women as compared to HIV positive men ($p<0.001$).

This present study was confined to 52 HIV positive individuals because of logistic reasons. This study reflects a need to take sufficiently large group of HIV infected patients and make an analysis to show long term effect of HIV on periodontal disease severity, with and without antiretroviral drug therapy and related issues.

Conclusions

Although periodontal disease has been established as a part of the spectrum of conditions associated with HIV infection, the links between them remain unclear. HIV-related periodontal disease undoubtedly exists and can be severe in some patients, yet relatively little is known about their prevalence and progression.

However, this study was carried out among a small number of HIV positive individuals and reflects a need to carry out further studies with large number of subjects to draw strong conclusive results.

References

1. Winkler JR, Murray PA. Periodontal disease. A potential intraoral expression of AIDS may be rapidly progressive periodontitis. *CDA J*. 1987;15:20-4.
2. Swango PA, Kleinman DV, Konzelman JL. HIV and periodontal health. A study of military personnel with HIV. *J Am Dent Assoc*. 1991;122:49-54.
3. Barr C, Lopez MR, Rua-Dobles A. Periodontal changes by HIV serostatus in a cohort of homosexual and bisexual men. *J Clin Periodontol*. 1992;19:794-801.
4. Drinkard CR, Decher L, Little JW, Rhame FS, Balfour HH Jr, Rhodus NL, et al. Periodontal status of individuals in early stages of human immunodeficiency virus infection. *Community Dent Oral Epidemiol*. 1991;19:281-5.
5. Smith GL, Cross DL, Wray D. Comparison of periodontal disease in HIV seropositive subjects and controls (I). Clinical features. *J Clin Periodontol*. 1995;22:558-68.
6. Martínez-Canut P, Guarinos J, Bagán JV. Periodontal disease in HIV seropositive patients and its relation to lymphocyte subsets. *J Periodontol*. 1996;67:33-6.
7. Doshi D, Ramapuram JT, Anup N, Sharma G. Correlation of CD4 cell count with gingival bleeding index in HIV positive individuals. *Med Oral Patol Oral Cir Bucal*. 2008;13:E348-51.
8. Gonçalves Lde S, Ferreira SM, Silva A Jr, Villoria GE, Costin-ha LH, Colombo AP. Association of T CD4 lymphocyte levels and chronic periodontitis in HIV-infected Brazilian patients undergoing highly active anti-retroviral therapy: clinical results. *J Periodontol*. 2005;76:915-22.
9. Greene JC, Vermillion JR. The simplified oral hygiene index. *J Am Dent Assoc*. 1964;68:7-13.
10. Rusell AL. A system of classification and scoring for prevalence surveys of periodontal disease. *J Dent Res*. 1956;35:350-9.
11. Robinson P. Periodontal diseases and HIV infection. A review of the literature. *J Clin Periodontol*. 1992;19:609-14.
12. Masouredis CM, Katz MH, Greenspan D, Herrera C, Hollander H, Greenspan JS, et al. Prevalence of HIV-associated periodontitis and gingivitis in HIV-infected patients attending an AIDS clinic. *J Acquir Immune Defic Syndr*. 1992;5:479-83.
13. Coates E, Slade GD, Goss AN, Gorkic E. Oral conditions and their social impact among HIV dental patients. *Aust Dent J*. 1996;41:33-6.
14. Ranganathan K, Magesh KT, Kumarasamy N, Solomon S, Viswanathan R, Johnson NW. Greater severity and extent of periodontal breakdown in 136 south Indian human immunodeficiency virus seropositive patients than in normal controls: a comparative

study using community periodontal index of treatment needs. *Indian J Dent Res*. 2007;18:55-9.

15. Lewis DA. Antiretroviral combination therapy for HIV infection. *Dent Update*. 2003;30:242-7.

16. McKaig RG, Thomas JC, Patton LL, Strauss RP, Slade GD, Beck JD. Prevalence of HIV-associated periodontitis and chronic periodontitis in a southeastern US study group. *J Public Health Dent*. 1998;58:294-300.

17. Klein RS, Quart AM, Small CB. Periodontal disease in heterosexuals with acquired immunodeficiency syndrome. *J Periodontol*. 1991;62:535-40.

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