Comparing the sub-gingival levels of Cytomegalovirus, Epstein-Barr virus, Porphyromonas gingivalis in human immunodeficiency virus-1 seropositive patients with and without antiretroviral therapy

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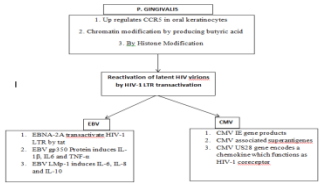
Introduction

Acquired immuno deficiency syndrome(AIDS) is a global pandemic with a constant surge in the number of cases being reported each year. The world health organization(WHO)recommended anti-retro viral therapy (ART) has played a large role in curbing the development of AIDS in human immunodeficiency virus (HIV) infected individuals. Although ART has shown to be highly effective in halting disease progression, its effect on other microbes including pathogenic bacteria and viruses is relatively unknown.

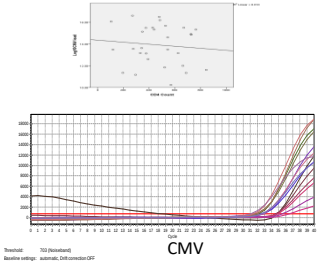


The main aim of this study is to explore the complex association between *Porphyromonas gingivalis* (P. g) and Epstein Barr Virusesm -1 (EBV)and Cytolomegaloviruses-1 (CMV) which, in turn, could give us an insight on the pathogenesis and treatment of AIDS associated periodontal disease. Further evaluation of P.g, EBV, and CMV in HIV positive patients with periodontitis on ART could add to our understanding of periodontal diseases in HIV seropositive patients and impact of ART on it.

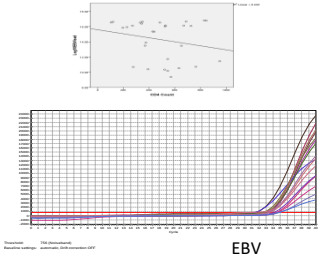
Results

Pathogen load	Control group (Median + IQR)	PreART group (Median + IQR)	ART Group (Median + IQR)	P- Value*
CMV	12.61 (6.3–14.1)	14.11 (13.0-15.1)	13.48 (11.6-16.0)	0.271
EBV	14.64 (8.9-14.6)	11.73 (10.4-16.0)	16.13 (13.6-16.5)	0.022
P .gingivalis	2.87 (2.71-3.29)	4.4 (2.97-5.42)	6.24 (3.53-8.15)	0.028

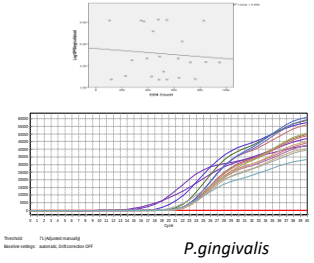
Pair wise comparison between control and Pre-ART group showed significant difference in *P gingivalis* bacterial load (P value= 0.028) while EBV and CMV viral loads did not show any significant difference. Comparison between control and ART group showed significant difference in *P gingivalis* bacterial load (P value= 0.019) & EBV viral load (P- value = 0.025)while CMV viral load did not show any significant difference. Comparison between Pre-ART and ART group showed significant difference in EBV viral load (P- value = 0.020) while *P gingivalis* bacterial load (P value= 0.439) & while CMV viral load (P value= 0.780)did not show any significant difference.



CMV

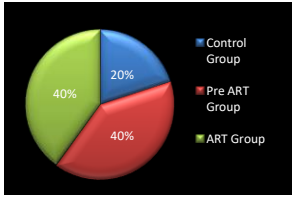


EBV



P.gingivalis

Demographic Details



Variables	Control group N (%)	PreART group N (%)	ART Group N (%)	Total N (%)	P- value*
Age <40 years ≥40 years	6 (60.0) 4 (40.0)	14 (70.0) 6 (30.0)	12 (60.0) 8 (40.0)	32 (64.0) 18 (36.0)	0.771
Sex Male Female	5 (50.0) 5 (50.0)	6 (30.0) 14 (70.0)	11 (55.0) 9 (45.0)	22 (44.0) 28 (56.0)	0.257

Comparison between groups	CMV load	EBV Load	*P.gingivalis* load
Control Vs Pre ART	0.138	0.744	0.028
Control Vs ART	0.196	0.025	0.019
Pre ART Vs ART	0.780	0.020	0.439

CMV viral loads were higher in patients with CD4 count less than 500 (14.23) as compared to CD4 count more than 500 (12.31) and this difference was statistically significant (P value= 0.025). Similarly, EBV viral loads were higher in patients with CD4 count less than 500 (15.05) as compared to CD4 count more than 500 (12.73) and his difference was statistically significant (P value= 0.029). *P gingivalis* bacterial loads although higher in patients with CD4 count less than 500 (5.14) as compared to CD4 count more than 500 (4.08) but this difference was not statistically significant (P value= 0.155).

Conclusion:

P.gingivalis was detected significantly higher in HIV patients with periodontitis (group 1 and 2) as compared to subjects who were HIV positive but clinically showing normal periodontal status (group 3). Thus, it can be proposed that P.gingivalis has a significant role in chronic periodontitis in HIV patients. The correlation between the herpesviruses like EBV and CMV with HIV-associated periodontitis was noted, but it was not specific with the CD4 levels and the ART status. There is a significant decrease in the CMV levels in the patients undergoing ART which can be primarily attributed to an increase in the circulating CD4 count. The EBV levels, however, do not decrease with the commencement of ART but showed an association with the ART duration. More longitudinal studies are required to effectively correlate the ART duration and EBV and CMV viral loads in HIV positive individuals. As all the microbial load analysis is done in the oral cavity, particularly the subgingival sulcus, we postulate that this ecological niche could be used for the evaluation of host modulation and viral load detection of EBV and CMV in HIV seropositive patients undergoing ART. These viruses could potentially lead to focal or disseminated inflammatory diseases in HIV patients. ART alone may not be able to suppress the growth of these herpesviruses as shown in the present study. During ART, any secondary infection with Herpes Viruses especially EBV and CMV may require additional use of Acyclovir to be added to the treatment protocol, to aid in the reduction of the viral load. Additionally, mechanical removal of plaque from the subgingival sulcus could disrupt the ecological niche of these period-pathogens. Thus, HIV seropositive patients, in addition to ART, may require additional use of acyclovir, and regular mechanical plaque removal to maintain their periodontal status, which in turn is shown to have a significant influence on the HIV disease progression.