Relationship of GCF IgA, IgG and Beta-Glucuronsidase to Changes in Periodontal Severity

R.E. Singer, J. Grbic, A.R. Biesbrock, C.H. Yeh, I. Lamster, N.P. Lang
Procter & Gamble Co., Cincinnati, OH, USA; Columbia University, New York, NY, USA; University of Beru, Bern, Switzerland

ABSTRACT

Text The goal of this investigation was to determine the association between gingival crevicular fluid (GCF) IgA and IgG concentrations, as well as GCF Beta-glucuronidase levels with gingivitis, pocket depth (PD) and attachment level (AL) and changes in those clinical parameters in an adult population with gingivitis and mild/moderate periodontitis. Subjects (n=110, mean age = 46.7) were enrolled in this study and at baseline graded for gingivitis (mean GI = 1.28) and examined by manual probing for full mouth PD (mean = 2.89mm) and AL (mean = 2.86). Twelve GCF samples were taken from six maxillary posterior teeth from each of 99 subjects. Six months later subjects were re-examined for GI, PD, and AL, and GCF samples were collected as at the baseline from 93 subjects. For subjects completing all phases of the study comparison of the six month clinical indices to baseline demonstrated significant decreases (p<0.001) in mean PD and AL but no significant change in GI. During that interval there were significant (p<0.001) increases in mean GCF IgA and IgG concentrations and a significant decrease in GCF BG level. At the baseline mean GI scores were positively correlated to mean GCF BG and IgG (r=0.26 and 0.43), while mean PD and AL were negatively correlated (r=-0.33 and -0.31) to mean GCF IgA concentration. Baseline GCF levels of BG were positively correlated with the change in mean PD and AL (r=0.27 and 0.22) over six months and the mean incidence of sites with 2 mm increases in PD (r=0.21). Conversely, baseline concentrations of GCF IgA and IgG were inversely related to the change in mean PD (r=-0. 29 and -0.43) and to the incidence of sites with 2 mm increases in PD (r=-0.29 and -0.35) and AL (r=-0.23 and -0.43). The baseline IgA concentration also was positively correlated (r=0.22) with the incidence of sites with 2 mm decreases in PD. In sum, the relationships seen here between GCF IgA, IgG and BG levels and the changes in clinical measures of periodontal severity suggest these GCF parameters reflect distinct host response processes and might be useful correlates to clinical outcomes.

OBJECTIVE

Determine correlations between GCF IgA and IgG concentrations and total GCF Beta-glucuronidase with

1. clinical measures of gingivitis and periodontitis and
2. changes in pocket depth and attachment loss over six months

MATERIALS AND METHODS

Text Monitor clinical and GCF variables at baseline and at six months in a population with gingivitis and mild/ moderate periodontitis.

Subjects:

- Enrolled 110
- Two or more sites with 5 mm pocket depth and 2 mm attachment loss

Baseline:

- Gingival Index and full mouth manual probing (UNC-15) for PD and AL
- Twelve GCF samples from six maxillary posterior teeth from each of 99 subjects.
- Subjects given placebo dentifrice and mouthrinse.

Six months:

- Examined for GI, PD, and AL
- GCF samples collected from 93 subjects.

GCF Analyses:

- BG via fluorometric assay
- IgG and IgA via ELISA (n=34 for IgG)

Demographic Characteristics

Mean age (SD)	46.7 (7.06) 35-64
Sex	
- female	68.7%
- male	31.3%
Race	Caucasian (100%)

RESULTS

Difference in Clinical Parameters between Baseline and Six Months

Clinical Parameters	Baseline Mean	Six Month Mean	p =
Gingival Index	1.28	1.27	ns
Gingival Bleeding	0.29	0.27	ns
Pocket Depth (mm)	2.89	2.69	0.001
Attachment Loss (mm)	2.86	2.47	0.001
Subjects had significant decreases in mean PD and AL Subjects' mean GI and Bleeding scores did not change			

Difference in GCF Parameters between Baseline and Six Months

GCF Parameters	Baseline Mean	Six Month Mean	p =
Beta-Glu (IU)	32.7	21.82	0.001
IgA Conc (ug/ml)	484.150	614.730	0.001
IgG Conc (ug/ml)	2433.0700	4222.810	0.001
Mean total GCF BG decreased significantly over 6 mos Mean GCF IgG and IgA concentrations increased significantly over 6 mos.			

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2719

Pg. 2

Correlation of GCF and Clinical Parameters at Baseline

Baseline Clinical Parameters	GCF BG	GCF [IgA]	GCF [IgC]
Gingival Index	r = 0.26 p = 0.009		
Gingival Bleeding	r = 0.24 p = 0.01		
Pocket Depth (mm)		r = -0.34 p = 0.0006	
Attachment Loss (mm)		r = -0.31 p = 0.002	

GI positively correlated with GCF BG
PD and AL inversely correlated to IgA

Correlation of Baseline (BL) Clinical Parameters to Change in Clinical Parameters over Six Months

Change in Clinical Parameters	BL GI	BL BS	Baseline Mean AL	Baseline Mean PD
Mean PD			r = 030 p = 0.002	r = 0.37 p = 0.0001
Mean AL				r = 0.21 p = 0.04
% sites with 2mm PD increase/subject			r = 0.39 p = 0.0001	r = 0.43 p = 0.0001
% sites with 2mm AL increase/subject			r = 0.33 p = 0.0005	r = 0.35 p = 0.0002
% sites with 2mm PD decrease/subject				r = -0.21 p = 0.03
% sites with 2mm AL decrease/subject			r = 0.22 p = 0.03	

Increases in AL and PD are correlated to baseline PD and AL but not to baseline GI or gingival bleeding

Correlation of Baseline GCF Parameters to Change in Pocket Depth and Attachment Loss over Six Months

Change in Clinical Parameters	GCF BG	GCF [IgA]	GCF [IgC]
Mean PD	r = 0.27 p = 0.008	r = -0.290 p = 0.005	r = -0.430 p = 0.01
Mean AL	r = 0.22 p = 0.03		
% sites with 2mm PD increase/subject	r = 0.210 p = 0.04	r = -0.290 p = 0.005	r = -0.35 p = 0.04
% sites with 2mm AL increase/subject		r = -0.230 p = 0.02	r = -0.40 p = 0.02
% sites with 2mm PD decrease/subject		r = 0.220 p = 0.03	
% sites with 2mm AL decrease/subject	r = -0.250 p = 0.020		

Baseline GCF BG positively correlated with increases in PD and AL
Baseline GCF IgA and IgG negatively correlated with increases in PD and AL

CONCLUSION

-This population experienced significant improvement in disease severity (PD and AL) over six months without a change in gingival index.

-GCF bio-marker parameters were better correlates to periodontal progression than were Gingival Index and/or gingival bleeding score.

-Improved periodontal health occurred concomitant with decreased mean total GCF BG and increased mean concentrations of GCF IgG and IgA.

-GCF BG levels appear to be a marker for an inflammatory and destructive host response. Conversely baseline levels of IgA and IgG appear to be markers for a protective host response.

-The findings suggest that improvements in periodontal health are associated with local decreases in inflammatory markers for a destructive response and/or local increases in immunologic markers of a protective response.

Research presented at the 78th General Session of the IADR, April 5-8, 2000

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