



EFFECT OF SCALING AND ROOT PLANING ON SERUM TOTAL PROTEIN LEVELS AND SERUM ALBUMIN LEVELS IN INDIVIDUALS WITH PERIODONTITIS- A PILOT STUDY

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ABSTRACT

Periodontitis is a chronic inflammatory disease caused by bacterial infection of the supporting tissues around the teeth. This study was conducted to evaluate changes in serum total protein and albumin levels in subjects with Periodontitis and periodontally healthy subjects; prior and subsequent to scaling and root planing. 10 Periodontitis and 10 Periodontally healthy subjects were selected for the study from the Out Patient Department of Periodontology of recognized dental college. Serum total protein, serum albumin levels and clinical variables of periodontal disease were assessed prior and two weeks subsequent to scaling and root planing. There was no statistically significant difference observed on intergroup and intragroup comparison. Thus, scaling and root planing does not have any effect on serum total protein and serum albumin levels in periodontitis subjects.

KEYWORDS : Periodontitis, Serum total protein, Serum albumin, Scaling and root planing.

INTRODUCTION

Periodontitis is a chronic inflammatory disease caused by bacterial infection of the supporting tissues around the teeth.¹ It is highly prevalent all over the world and is an important health challenge in different countries.^{2,3} Early diagnosis and treatment play a key role in the prevention of periodontitis progression.⁴ Currently, the diagnosis of periodontitis almost completely relies on a number of clinical parameters such as probing pocket depth (PPD), bleeding on probing (BOP), clinical attachment level (CAL) and radiographic findings.⁵ These measurements for the diagnosis of periodontitis usually have limited efficacy because they predominantly indicate periodontal disease activity in the past, not the ongoing disease activity. It is necessary to develop new diagnostic tests in order to determine the presence of active disease, predict its progression in future and evaluate response to periodontal treatment by assessing improvements in clinical parameters of the periodontium. Hence, today, various researches are being conducted to evaluate possible compounds in the oral fluids through which it may be possible to assess the presence and severity of these diseases as well as to identify the subjects at risk for these diseases. Advances in research on the diagnosis of periodontal disease exhibit trends toward techniques that can identify periodontal risks with the use of objective measurements such as biomarkers.

Biomarkers are synthesized and secreted by both healthy and systemically affected subjects. Biomarkers have the potential for use to assess the health, initiation of the disease, the response to treatment and treatment outcomes.⁶ Serum albumin is a protein, the concentration of which undergoes changes in inflammatory conditions.⁷ In chronic diseases in which inflammatory cytokines such as IL-1, IL-6 and α -factor are released, serum albumin levels decrease.⁸ A large number of researchers has reported a relationship between a decrease in serum albumin levels and patient mortality.^{9,10} In addition, studies have shown that there is an association between severe periodontitis and changes in the serum levels

of inflammatory markers.^{11,12,13} However, some other studies have yielded contradictory results.^{14,15}

Hence, this study was conducted to evaluate the effect of scaling and root planing on serum total protein and albumin levels in periodontitis and periodontally healthy subjects, prior and subsequent to scaling and root planing.

MATERIALS AND METHODS

A pilot study was designed on 20 subjects reporting to the Out Patient Department of Periodontology, of the age group of 20-55 years, on 10 subjects with Periodontitis (cases) and 10 subjects were selected as periodontally healthy subjects (controls). Ethical clearance was obtained from the Institutional ethical committee. Informed signed consent was obtained from subjects participating in the study, after being explained about nature and purpose of study in a language best understood by them.

1) Subjects of either sex in the agegroup of 20-55 years, 2) minimum of 20 teeth present, 3) systemically healthy and co-operative subjects, with Periodontitis (Buccal or oral CAL \geq 3 mm with pocketing $>$ 3 mm is detectable at \geq 2 teeth), 4) mean bleeding index score $>$ 1 according to bleeding index (BI), 5) Russel's Periodontal Index score 6 and 8; were included. 1) Subjects with history of antibiotic and/or anti-inflammatory drugs within previous 6 months, 2) any systemic diseases and infectious conditions other than Periodontitis, 3) use of mouthwashes and vitamin supplements in the 3-month period before the study, 4) pregnant women, women on oral contraceptive medication and lactating mothers, 5) any medications, 6) smokers and/or tobacco chewers. 7) who have undergone any periodontal therapy in past 6 months; were excluded.

The subjects were randomly assigned by simple randomized sampling into two groups, of 10 subjects each. Case history was recorded for all the subjects participated in the study.

Serum total protein levels were measured for each sample using Biuret method and serum albumin levels were measured using BCG dye method. The clinical parameters {Sulcus Bleeding index (BI)¹⁶, Russel's Periodontal Index (RPI)¹⁷} was measured using a UNC-15 graduated periodontal probe at baseline and 2 weeks post-scaling. Scaling and root planing was done and standard oral hygiene instructions was given to all the subjects who participated in the study. All the subjects were instructed to rinse their mouth with 10 ml of their CHX mouthrinse for 1 min twice daily for 14 days, 30 min after brushing.

STATISTICAL ANALYSIS

Data obtained was compiled on a MSOffice Excel Sheet (v 2010, Microsoft Redmond Campus, Redmond, Washington, United States). Data was subjected to statistical analysis using Statistical package for social sciences (SPSS v 21.0, IBM). Descriptive statistics like frequencies and percentage for categorical data, Mean & SD for numerical data has been depicted. Inter group comparison (2 groups) was done using t test. Intra group comparison was done using paired t test (upto 2 observations). For all the statistical tests, p<0.05 was considered to be statistically significant, keeping α error at 5% and β error at 20%, thus giving a power to the study as 80%.

There was a statistically non-significant difference seen for the values between and within the groups (p>0.05); as seen in table 1 and 2.

TABLE 1

Inter group comparison						
GROUP	N	Mean	Std. Deviation	Std. Error Mean	T value	p value of t test
Serum total protein B	1	6.9300	.46916	.14836	-.360	.723#
	2	7.0050	.46133	.14589		
Serum albumin B	1	4.528000	.2659908	.0841137	-1.734	.100#
	2	4.751000	.3077680	.0973248		
Serum total protein A	1	6.9000	.39441	.12472	-.503	.621#
	2	6.9950	.44789	.14164		
Serum albumin A	1	4.630000	.2983287	.0943398	-1.830	.084#
	2	4.873000	.2954488	.0934291		

TABLE 2-

Intra group comparison for GRP 1							
	Mean	Std. Deviation	Std. Error Mean	Mean diff	SD of diff	T value	p value of paired t test
SERUM TOTAL PROTEIN B	6.9300	.46916	.14836	.03000	.16364	.580	.576#
SERUM TOTAL PROTEIN A	6.9000	.39441	.12472				
SERUM ALBUMIN B	4.528000	.2659908	.0841137	-.1020000	.1851606	-1.742	.115#
SERUM ALBUMIN A	4.630000	.2983287	.0943398				

Intra group comparison for GRP 2							
	Mean	Std. Deviation	Std. Error Mean	Mean diff	SD of diff	T value	p value of paired t test
SERUM TOTAL PROTEIN B	7.0050	.46133	.14589	.01000	.03162	1.000	.343#
SERUM TOTAL PROTEIN A	6.9950	.44789	.14164				
SERUM ALBUMIN B	4.751000	.3077680	.0973248	-.1220000	.2849093	-1.354	.209#
SERUM ALBUMIN A	4.873000	.2954488	.0934291				

* = statistically significant difference (p<0.05)
 ** = statistically highly significant difference (p<0.01)
 # = non significant difference (p>0.05) ... (for table 1 and 2)

RESULTS

Observations of the study was recorded and tabulated. The results of the study was subjected to descriptive statistical analyses (mean \pm SD). On intragroup comparison, there was no statistically significant difference observed prior and subsequent to scaling and root planing in Periodontitis and periodontally healthy subjects. On intergroup comparison, there was no statistically significant difference observed prior and subsequent to scaling and root planing in Periodontitis

and periodontally healthy subjects.

FIGURE 1

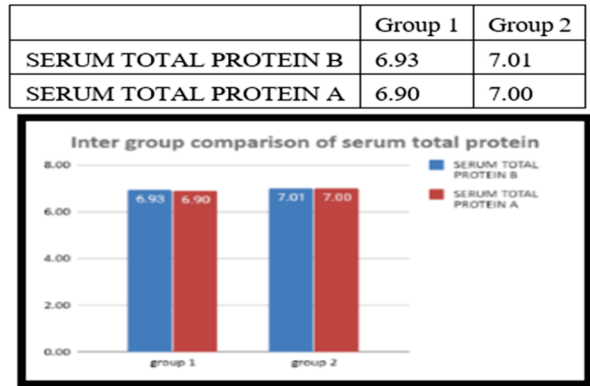
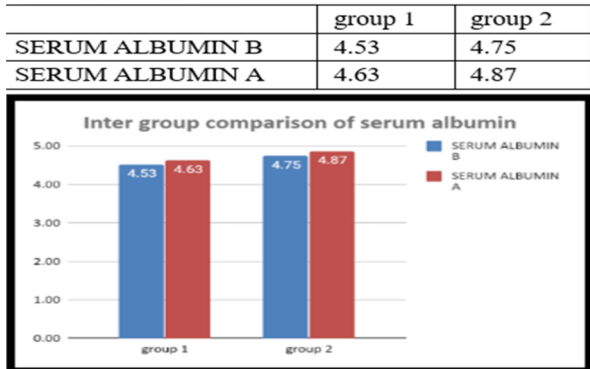


FIGURE 2



DISCUSSION

Periodontitis is induced by the bacterial infection of tooth-supporting structures.¹⁸ The host response to bacterial infection results in changes in the concentrations of acute-phase proteins and the synthesis and release of IL-1, IL-6 and TNF- α . These proinflammatory cytokines have a key role in the destruction of periodontal tissues. The response of acute-phase proteins demonstrates the defensive and adaptive mechanisms taking place prior immunologic responses in the body.¹⁹ Serum albumin is considered as one of the negative acute-phase proteins produced by the liver and is considered an inflammatory marker.⁷ Although the exact mechanism of the effect of periodontal disease on serum albumin levels is still unknown, it appears such relationship might be attributed to two hypotheses: the nutritional effects and the inflammatory effects of periodontal disease. Several studies have shown a relationship between individuals' nutritional status and serum albumin levels.^{20,21}

This study was designed to evaluate changes in serum total protein and albumin levels in subjects with Periodontitis and periodontally healthy subjects; prior and subsequent to scaling and root planing. The results showed no association between serum total protein and serum albumin levels in subjects with Periodontitis prior and subsequent to scaling and root planing, which was in contradictory to other studies. Shirmohammadi A. et al (2018)²² reported that, decrease and increase in serum albumin levels under the effect of periodontal disease and its treatment indicated an inverse relationship between the albumin levels of serum and chronic periodontitis. Kaur N. et al (2006)²³ reported that inverse relationship was found between the serum albumin concentration and chronic periodontal disease. However, the length of follow-up in studies and methods of measurement, evaluating the relationship between periodontitis and serum albumin levels varies greatly, reflecting differences between studies. Iwasaki M. et al (2008)³ stated that, serum albumin

concentration is a significant risk predictor of periodontal disease progression among non-smokers. Ogawa H. et al (2006)⁷ stated that, there might be an inverse relationship between periodontal disease and serum albumin concentration in these elderly subjects.

The present study was a preliminary study, where no association was found between serum albumin levels and periodontal disease and in order to achieve more definitive results, it is necessary to evaluate the relationship between serum levels of albumin and the concentrations of inflammatory cytokines such as TNF- α , IL-6 and IL-1 so that the relationship between inflammation and serum albumin levels will be further elucidated. However, this study has some limitations- small sample size and shorter duration.

CONCLUSION

Scaling and root planing does not have any effect on serum total protein and serum albumin levels in periodontitis subjects. Further studies with larger samples sizes and prolonged duration are necessary to determine whether serum levels of total protein and albumin can be used as a diagnostic factor for periodontal diseases.

FUTURE PROSPECTS

Further, more studies are required to confirm the findings of this study.

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