

ORIGINAL RESEARCH

Comparative evaluation of serum albumin levels in clinically healthy individuals and chronic periodontitis patients

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ABSTRACT:

Background: Periodontitis is a chronic inflammatory disease caused by bacterial infection of the supporting tissues around the teeth. Serum albumin levels might be the practical marker of general health status. Albumin concentration is associated with nutrition and inflammation. **Material and method:** 200 patients were enrolled in this study. These patients were divided into two groups of 100 each: Group 1: 100 patients with clinical and radiographic diagnosis of chronic periodontitis, Group 2: 100 clinically healthy. All demographic details, clinical and radiographic data of these patients was obtained. Fasting blood samples of the patients were collected. These samples were sent to laboratory for biochemical analysis of serum albumin levels. An autoanalyser was used to calculate the levels of serum albumin. **Results:** Out of 200 patients 66 patients were less than 35 years old and 134 patients were above 35 years of age. Out of the 100 patients in the periodontitis group 71 patients were above 35 years of age and only 29 were below 35 years of age. 61 out of 100 patients in the periodontitis group being males. The rural population was more affected with periodontitis. Mean serum albumin levels among the patients of the periodontitis group were found to be 4.37 g/dL. Mean serum albumin levels among the subjects of the control group were found to be 5.01 g/dL. Mean serum albumin levels among the patients with chronic periodontitis group was significantly lower in comparison to the control group. **Conclusion:** Reduced serum albumin concentration was observed in patients suffering from chronic periodontitis.

Keywords: Serum Albumin, Chronic Periodontitis.

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INTRODUCTION

Periodontal infection has been implicated as a risk factor for systemic diseases such as coronary heart disease and diabetes¹. It has been suggested that impaired dentition status, such as tooth loss owing to periodontal infection, may affect individuals by causing dietary restrictions through difficulty in chewing, possibly compromising their nutritional status and well-being². Periodontitis is a chronic inflammatory disease caused by bacterial infection of the supporting tissues around the teeth³. Serum albumin is a negative acute phase protein and serum albumin levels might be the practical marker of general health status⁴.

Serum albumin is the most abundant plasma protein in humans and is produced in the liver. Albumin is essential

for maintaining the osmotic pressure needed for proper distribution of body fluids between intravascular compartments and body tissues. The range of albumin concentration in blood is 30–50 g/l⁵. It is apparent that oral disease might be indicated and monitored by the level of serum albumin. Serum albumin levels might be the marker of general health status as they described the severity of an underlying disease and mortality in the elderly⁶.

Inflammation and malnutrition both reduce serum albumin concentration by decreasing its rate of synthesis. This suggests that periodontal disease severity might be indicated and monitored by the levels of serum albumin. Therefore, serum albumin can be used as a risk predictor for periodontal disease⁷. The purpose of this

study was to assess and compare the serum albumin levels in clinically healthy individuals and chronic periodontitis patients.

MATERIAL AND METHOD

The purpose of this study was to assess and compare the serum albumin levels in clinically healthy individuals and chronic periodontitis patients. In all 200 patients were enrolled in this study. These patients were divided into two groups of 100 each:

- Group 1: 100 patients with clinical and radiographic diagnosis of chronic periodontitis
- Group 2: 100 clinically healthy

The patients were also informed about the purpose of the study. Written consent was obtained. All demographic data of these patients was obtained. Detailed clinical examination was carried out and subsequent data was recorded. Radiographic records were also obtained to evaluate the extent and severity of periodontal disease. Patients with systemic diseases an immune-compromised status were excluded from the study.

Patients were asked to report early morning and fasting blood samples were collected in sterile test tubes. These samples were sent to laboratory for biochemical analysis of serum albumin levels. An auto-analyser was used to calculate the levels of serum albumin.

Entire data was recorded in the Microsoft excel sheets. SPSS software was used for statistical analysis. Chi square test and student T test were use to compare the variables. P-value of less than 0.05 was considered significant.

RESULTS

The purpose of this study was to assess and compare the serum albumin levels in clinically healthy individuals and chronic periodontitis patients. From the data collected it was seen that out of 200 patients 66 patients were less than 35 years old and 134 patients were above 35 years of age. Out of the 100 patients in the periodontitis group 71 patients were above 35 years of age and only 29 were below 35 years of age. Males were more affected in the periodontal health with 61 out of 100 patients in the periodontitis group being males (table 1).

Table 1: Demographic and clinical data

Variable		Number	
		Periodontitis group	Control group
Age :	Less than 35	29	37
	More than 35	71	63
Gender:	Male	61	44
	Female	39	56
Residence :	Urban	32	59
	Rural	68	41

It was observed in this study that the rural population was more affected with periodontitis with 68 out of 100 patients having a rural background. Remaining 32 patients were from an urban background. In the control

group 59 patients were from urban and 41 were from rural background (table 1). In the current study, mean serum albumin levels among the patients of the periodontitis group were found to be 4.37 g/dL. Mean serum albumin levels among the subjects of the control group were found to be 5.01 g/dL. The standard deviation of the periodontitis group and the control group came out to be ±2.03 and ±2.64 respectively. While comparing statistically, it was seen that mean serum albumin levels among the patients with chronic periodontitis group was significantly lower in comparison to the control group (table 2).

Table 2: Comparison of serum albumin levels

Groups	Mean serum albumin (g/dL)	SD
Periodontitis group	4.37	2.03
Control group	5.01	2.64
t-value	134.81	
p-value	0.001*	

*: Significant

DISCUSSION

Many conditions such as inflammatory states, liver diseases, and renal diseases have been indicated to reduce serum albumin levels⁸. Serum albumin level is a practical marker of the general health status as it demonstrates the severity of an underlying disease and mortality in the elderly. Several studies have demonstrated that serum albumin concentrations are associated with general health status among the elderly. Moreover, malnutrition may also be monitored by means of serum albumin concentration. Serum albumin is the main protein synthesized by the liver. Inflammation and malnutrition both reduce albumin concentration by decreasing its rate of synthesis⁹⁻¹¹.

Serum albumin is a negative acute-phase protein that supports the contention that serum albumin is a marker of inflammation¹². Chronic diseases are associated with inflammation and the release of inflammatory cytokines such as interleukin 1, interleukin 6, and tumor necrosis factor α, which cause a decrease in serum albumin¹³. Consequently, it is very important to study the association between periodontal disease and serum albumin levels, which reflect the general health status in the elderly who may be at a higher risk of developing inflammatory conditions or disorders.

From the data collected it was seen that out of 200 patients 66 patients were less than 35 years old and 134 patients were above 35 years of age. Out of the 100 patients in the periodontitis group 71 patients were above 35 years of age and only 29 were below 35 years of age. Males were more affected in the periodontal health with 61 out of 100 patients in the periodontitis group being males (table 1). Rajashri A Kolte et al evaluated the relationship between periodontal disease and general

health status in adults using the serum albumin concentration. A total of 100 patients of both genders with age range of 40 to 70 years were included in the study. Patients were divided into the following two groups: clinically healthy subjects and patients with periodontitis, that is, loss of attachment ≥ 5 mm. Dental examinations were carried out at baseline and clinical attachment levels were measured at four sites. Serum albumin concentration was estimated by bromocresol green albumin method. The mean serum albumin levels for Group I was 4.47 g/dl with standard deviation (SD) of 0.276 and for Group II, the mean value of serum albumin was 4.61 g/dl with SD of 0.273. Using Student's unpaired 't' test, the difference between the serum albumin levels in Group I and Group II were found to be statistically significant ($P=0.020$). The mean body mass index values for Group I was 22.63 with a SD of 3.85, whereas the same for Group II was 22.23 with a SD of 4.21, which were on comparison, found to be nonsignificant ($P=0.462$). The findings of the clinical trial suggest an inverse relationship between the serum albumin concentration and chronic periodontal disease¹⁴.

It was observed in this study that the rural population was more affected with periodontitis with 68 out of 100 patients having a rural background. Remaining 32 patients were from an urban background. In the control group 59 patients were from urban and 41 were from rural background. Navkiran Kaur et al evaluated the relationship between periodontal health status and serum albumin levels. A total of 60 subjects of both genders with age range of 40-70 years were included in the study. Patients were divided into two groups viz. Group I; clinically healthy subjects and Group II; patients with chronic periodontitis, that is, loss of attachment ≥ 5 mm. Serum albumin concentration was estimated by bromocresol green albumin method. The mean value of serum albumin levels for Group I was 4.815 g/dL with standard deviation (SD) of 0.127 and for Group II, the mean value of serum albumin levels was 4.219 g/dL (SD 0.174). The difference between serum albumin levels in Group I and Group II were found to be statistically significant ($P \leq 0.001$). The findings of this clinical trial suggest an inverse relationship between the serum albumin concentration and chronic periodontal disease¹⁵. In the current study, mean serum albumin levels among the patients of the periodontitis group were found to be 4.37 g/dL. Mean serum albumin levels among the subjects of the control group were found to be 5.01 g/dL. The standard deviation of the periodontitis group and the control group came out to be ± 2.03 and ± 2.64 respectively. While comparing statistically, it was seen that mean serum albumin levels among the patients with chronic periodontitis group was significantly lower in comparison to the control group (table 2). Manish Arun Ashtankar et al studied the effect of surgical periodontal therapy (flap surgery) on serum albumin in chronic periodontitis patients. Fifty participants of generalized chronic periodontitis were selected from the outpatient department. Clinical parameters were recorded at baseline, after 1 month, and 3 months. Venous blood was

collected at baseline and 3 months after surgery from the participants to measure serum albumin by the bromocresol green albumin method. Serum albumin level increased from baseline to follow-up period after surgical periodontal treatment, i.e., 3 months. This effect was found to be statistically significant (<0.001) in both groups as per the paired t-test. Surgical periodontal treatment (open flap debridement) has a positive effect on serum albumin level¹⁶.

CONCLUSION

From the above study the author concluded that a reduced serum albumin concentration was observed in patients suffering from chronic periodontitis. Further studies are recommended.

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