

## Research Article

### INFLUENCE OF NON SURGICAL THERAPY ON SERUM ALBUMIN AND WBC COUNT IN DIABETIC AND NON DIABETICS WITH CHRONIC PERIODONTITIS

P.ARAVIND KUMAR<sup>1</sup>, RASAGNYA.Y<sup>2</sup>, S.V.V.S MUSALAIAH<sup>3</sup>, M.NAGASREE<sup>4</sup>, P.INDEEVAR<sup>5</sup>

<sup>1</sup> PROFESSOR, DEPARTMENT OF PERIODONTICS, ST.JOSEPH DENTAL COLLEGE AND HOSPITAL

<sup>2</sup> PG STUDENT, DEPARTMENT OF PERIODONTICS, ST.JOSEPH DENTAL COLLEGE AND HOSPITAL.

<sup>3</sup> PROFESSOR, AND HEAD OF THE DEPARTMENT, DEPARTMENT OF PERIODONTICS, ST. JOSEPH DENTAL COLLEGE AND HOSPITAL.

<sup>4</sup> PROFESSOR, DEPARTMENT OF PERIODONTICS, ST.JOSEPH DENTAL COLLEGE AND HOSPITAL.

<sup>5</sup> SENIOR LECTURER, DEPARTMENT OF PERIODONTICS, ST.JOSEPH DENTAL COLLEGE AND HOSPITAL.

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## ABSTRACT

**BACKGROUND:** Periodontal disease is a complex, multifactorial, chronic inflammatory disease that involves destruction of Periodontium. Many systemic diseases have been implicated as risk factors or risk indicators in periodontal disease. Clinical research over the past decades has led to an improved understanding and appreciation of periodontal pathogens. It has been indicated that there might be a difference between serum Albumin levels and WBC count among Diabetic and non-Diabetic patients with chronic periodontitis.

**AIM:** The aim of my study is to evaluate levels of serum Albumin and WBC [WHITE BLOOD CELLS] count in Diabetic and non-Diabetic patients with chronic periodontitis before and after phase I therapy.

**Materials and methods:** 20 patients were divided in to two groups i.e., Group A [Diabetic], Group B [non Diabetic]. Clinical parameters like Gingival index [GI], Plaque index [PI], Probing depth [PD], Clinical attachment level [CAL] were recorded at baseline. Furthermore Biochemical parameters like serum Albumin, WBC counts were assessed at baseline and at 1 month after nonsurgical periodontal therapy.

**Results:** The present study showed significant gain in serum Albumin and reduced values of WBC count in both groups with more gain in serum Albumin levels & decrease in WBC count more pronouncedly in Group B.

**Conclusion:** Within the limitations of the study there is a significant correlation of serum Albumin and WBC levels. An elevated WBC count, along with a decreased value of serum Albumin has been observed before Scaling and root planning [SRP]. However after SRP decreased values of WBC, along with elevated values of serum Albumin has been observed there by establishing a correlation between periodontitis WBC and serum Albumin levels.

**Keywords:** Periodontitis, serum Albumin, WBC, Diabetic, non-Diabetic.

## Introduction:

Periodontal disease is a multifactorial inflammatory disorder that is related to the accumulation of oral microbial biofilm and the host response to this accumulation.<sup>1</sup> Periodontal infection has been imputed as a risk factor for systemic diseases such as coronary heart disease and Diabetes.<sup>2</sup>

It has been suggested that individuals with compromised nutritional status and wellbeing have impaired dentition status such as tooth loss owing to periodontal infection (Chauncey et al.

1984, Papas et al. 1989, Hollister & Weintraub 1993)<sup>3</sup>.

Serum Albumin level is a practical marker of the general health status as it indicates the severity of veiled disease and mortality in the elderly. Serum Albumin is the main protein synthesized by the liver. It also acts as plasma carrier by non-specifically binding several hydrophobic steroid hormones and as a transport protein for Hemin and fatty acids. The range of Albumin concentration in blood is 30-50g/L.<sup>4</sup>

Inflammation and malnutrition both reduce Albumin concentration by decreasing its rate of synthesis<sup>5</sup>. Chronic diseases are associated with inflammation and the release of inflammatory cytokines such as interleukin-1, interleukin6, and tumour necrosis factor  $\alpha$ , which cause a decrease in serum Albumin. Albumin concentration is associated with nutrition and inflammation.<sup>6</sup>

Diabetes mellitus is a group of metabolic disorders characterized by chronic hyperglycemia with disturbances of carbohydrates, fat and protein metabolism resulting from the defects in insulin secretion, insulin action or both. Periodontitis is regarded as sixth complication for Diabetes. Various studies have been documented the relationship between serum Albumin and Diabetes<sup>7</sup>.

For many years, blood has been considered as an eventual body fluid that could demonstrate disease process. In the past decade, there has been a revived significance in the ways in which cellular and molecular components of blood have been altered by periodontal disease.<sup>8</sup>

Increase in the number of White blood corpuscles [WBCs] is attributed to the increase of polymorpho nuclear cells predominantly, which are key participants in the periodontal lesion and is also considered a strong independent predictor of future coronary heart disease.

The significance of WBC in Differential white blood cell count points towards the presence of infection and inflammation, which can be the risk factors for systemic conditions and diseases.<sup>9</sup>

WBC has also been associated with atherosclerosis in a number of various studies and is considered to be a risk factor for the disease<sup>10,11</sup>.

The aim of the study is to compare and evaluate serum Albumin levels and WBC count in Diabetic and non-Diabetic chronic periodontitis patients.

#### **MATERIALS AND METHODS:**

This was an interventional trail of 20 patients visiting the Department of Periodontics & Implantology, St. Joseph dental college and hospital during the period of January 2015 to July 2015 were screened. Patients were age and gender matched and divided in to 2 groups i.e., 1]

Group A with 10 Diabetic patients [pre -screened by HBA<sub>1c</sub> and GTT]

2] Group B with 10 non -Diabetic patients.

All subjects agreed and signed an informed consent in line with Helsinki Declaration [2013]. The study was reviewed and approved by the Ethical Committee of the Faculty of Dentistry, NTR University.

#### **INCLUSION CRITERIA:**

- 1] Patients having probing pocket depth >5mm in at least 30% of sites.
- 2] Patients of age 30-40 years.
- 3] Patients who are not under antimicrobial therapy from past 6 months.
- 4] Patients who were not having any systemic diseases for therapy other than Diabetes.

#### **EXCLUSION CRITERIA:**

- 1] Patients who were pregnant and lactating
- 2] Patients who have habit of smoking
- 3] Patients having systemic illness other than Diabetes mellitus.
- 4] Patients who underwent treatment for any periodontal disease were excluded from study.

Parameters like Plaque index, gingival index, Clinical attachment level, Probing pocket depth, Serum Albumin and WBC count were assessed at baseline and 4 weeks.

Initially 5ml of blood was drawn from the anti cubital vein blood is centrifuged\* and serum is separated at baseline before scaling and root planning. The sample was stored and transferred to VIMTA labs®. WBC {white blood cells} level was analysed using semiautomatic analyser and serum albumin through Bromocresol green kit. A second sample was collected 4 weeks after SRP and the whole process was repeated and values were noted.

#### **STATASTICAL ANALYSIS:**

Statistical analysis was done through SPSS version 20. Intra group analysis was done through students paired t test and inter group analysis was done through students unpaired t test

**RESULTS:**

In Group A, there was a significant reduction in PI, GI, PD, and CAL after 4 weeks with P values 0.002, 0.001, 0.000, and 0.000 respectively. Serum Albumin and WBC count were also found to be significantly decreased with P values of 0.000, 0.003 respectively.

In Group B, there was a significant reduction in PI, GI, PD, and CAL after 4 weeks with P values 0.000, 0.005, 0.000, and 0.000 respectively. Serum Albumin and WBC count were also found to be significantly decreased with P values 0.001, 0.001 respectively.

**TABLE 1: COMPARISON OF MEAN,SD,TEST OF SIGNIFICANCE OF CLINICAL PARAMETERS PLAQUE INDEX, GINGIVAL INDEX, PROBING DEPTH, CLINICAL ATTACHMENT LEVEL , SERUM ALBUMIN, WBC COUNT IN DIABETIC [GROUP A]**

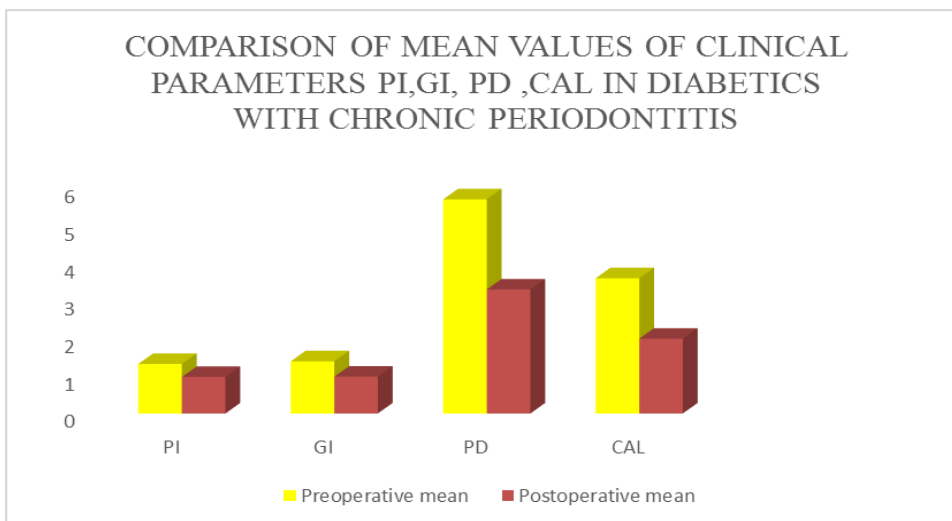
PARAMETERS	MEAN	SD	P VALUE
PLAQUE INDEX[PI]	0.9710	0.06806	0.002
GINGIVAL INDEX[GI]	0.9810	0.04280	0.001
PROBING DEPTH[PD]	3.30	0.483	0.000
CLINICALATTACHMENT LEVEL[CAL]	1.990	0.4725	0.000
SERUM ALBUMIN	3.900000	0.2118700	0.000
WBC COUNT	8260.00	2109.871	0.003

**TABLE 2: COMPARISON OF MEAN ,SD,TEST OF SIGNIFICANCE OF CLINICAL PARAMETERS PLAQUE INDEX, GINGIVAL INDEX, PROBING DEPTH, CLINICAL ATTACHMENT LEVEL, SERUM ALBUMIN, WBC COUNT IN NON DIABETIC [GROUP B]**

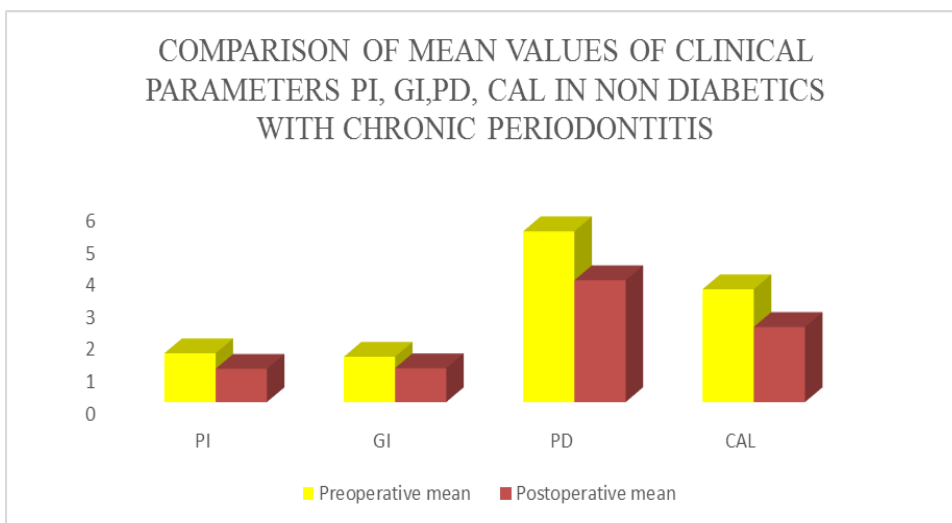
CLINICAL PARAMETERS	MEAN	SD	P VALUE
PLAQUE INDEX[PI]	1.0350	0.06311	0.000
GINGIVAL INDEX[GI]	1.0510	0.07978	0.005
PROBING DEPTH[PD]	3.70	0.483	0.000
CLINICAL ATTACHMENT LEVEL[CAL]	2.30	0.483	0.000
SERUM ALBUMIN	4.201000	0.1031445	0.001
WBC COUNT	8100.00	531.455	0.001

**TABLE 3: COMPARISON OF MEAN VALUES OF BIOCHEMICAL PARAMETERS SERUM ALBUMIN, WBC COUNT IN BOTH GROUP A, GROUP B**

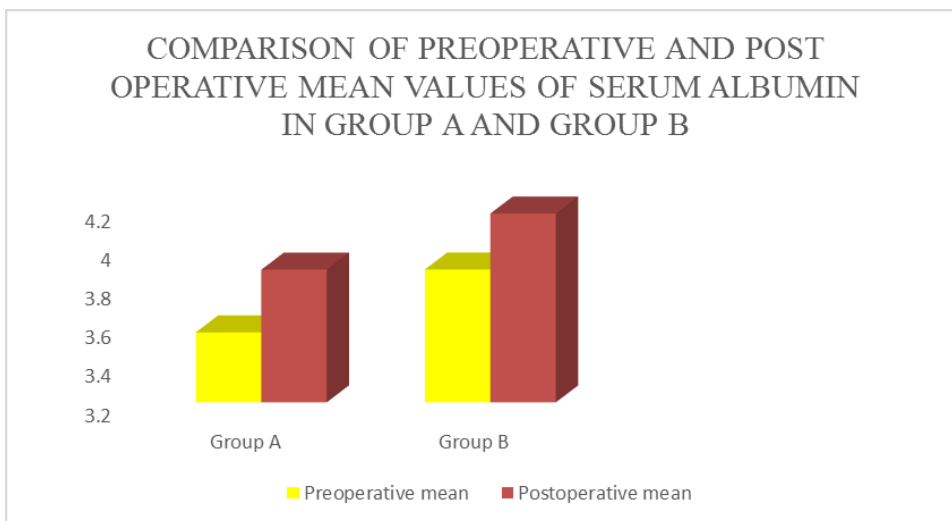
BIOCHEMICAL PARAMETERS	GROUP A	GROUP B
SERUM ALBUMIN	3.900000	4.201000
WBC COUNT	8260.00	8100.00



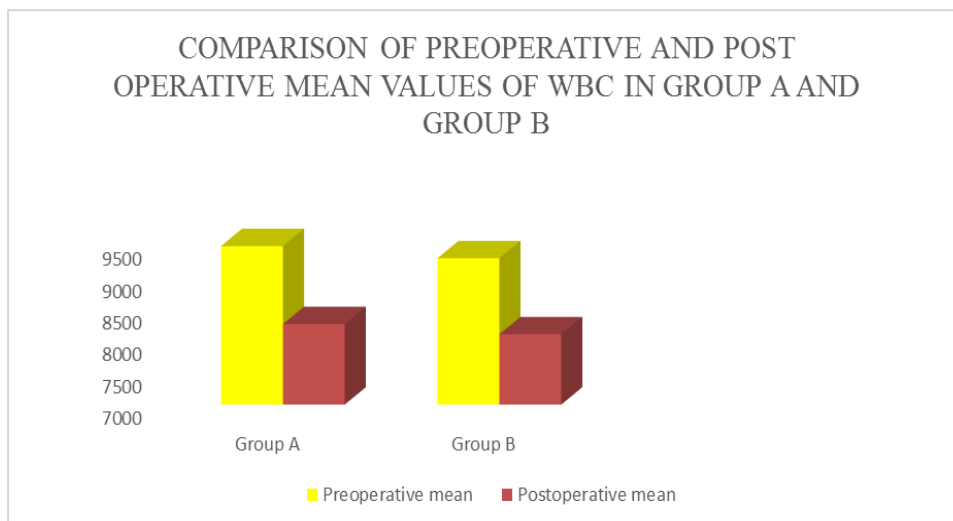
GRAPH 1: COMPARISON OF MEAN VALUES OF CLINICAL PARAMETERS PLAQUE INDEX, GINGIVAL INDEX, PROBING DEPTH, CLINICAL ATTACHMENT LEVEL IN DIABETIC [GROUP A]



GRAPH 2: COMPARISON OF MEAN VALUES OF CLINICAL PARAMETERS PLAQUE INDEX, GINGIVAL INDEX, PROBING DEPTH, CLINICAL ATTACHMENT LEVEL IN NON DIABETIC [GROUP B]



GRAPH 3: COMPARISON OF PRE OP AND POSTOP MEAN VALUES OF SERUM ALBUMIN IN GROUPA AND GROUP B



GRAPH 4: COMPARISON OF PRE OP AND POST OP MEAN VALUES OF WBC IN GROUP A AND GROUP B

#### DISCUSSION:

The cellular and molecular mechanisms in an inflamed periodontal tissue are interconnected and lead to systemic effects. Various studies suggest that periodontitis is associated with an increased risk of systemic diseases like cardiovascular diseases, cerebrovascular ischemia, atherosclerosis and Pre-term low birth weight of infants.<sup>12</sup>

Lowered serum Albumin levels and high WBC count activates the immune system and inflammation which has got some evidence from prospective studies in Pima Indians and other populations.<sup>13</sup>

In the present study WBC count and serum Albumin levels were evaluated at baseline and one month before and after SRP in Diabetic and non-Diabetic patients with chronic periodontitis patients who were age and gender matched .

Any infection in the body leads to increase in WBC count <sup>14</sup>. In this study, infections related to systemic disease were excluded except Diabetes mellitus. Patients were subjected to SRP. WBC count were evaluated after 14 days of SRP and compared with the WBC count at baseline as the average life span of leukocytes is 14 days.

In both the Groups, there was a significant decrease in WBC value after SRP with more decreased value in Group B which can be attributed to SRP which was effective in reducing the microbial population. The pronounced

decrease in WBC count in Group B have reduced the risk for cardiac problem, Type 2 diabetes and atherosclerosis which were associated with high WBC count.

In the present study a significant association was found between periodontal disease and the serum albumin concentration. Some epidemiological studies have demonstrated a relationship between dental status and level of serum albumin. Accordingly, results have supported previous reports indicating an association between oral health status particularly periodontal disease and level of serum albumin<sup>2</sup>.

In both the Groups, there was a significant increase in the values of serum albumin i.e. to its normal serum level, with more pronounced increase in Group B after SRP .This shows that SRP is effective in reducing the bacterial load which were the main culprits of the increased levels of inflammatory mediators resulting in the inflammation. This was in accordance with the studies done by Yoshiara et al 2006. The less pronounced value in Group A could be due to Diabetes which is a chronic inflammatory disease and Serum albumin level is decreased in inflammation.

There is a significant reduction in GI & PI values in both Groups from baseline to 1 month. This can be attributed to the fact that there was reduction in supra gingival plaque after SRP and oral hygiene instructions received during preliminary visits as given by Knowles et al., in 1979<sup>15</sup> and Ramfjord et al., 1987<sup>16</sup>.

There was significant reduction in the PPD and gain in CAL in Group A&B which can be attributed to SRP therapy which eliminated the bacteria present at the site and also reduces colonization of the periodontal pathogens, and thus makes a favorable environment in patient maintenance of oral hygiene instructions and usage of antibiotics<sup>17,18</sup>.

#### CONCLUSION:

Within the limitations of the study there is a significant correlation of serum Albumin and WBC levels. An elevated WBC count, along with a decreased value of serum Albumin has been observed before Scaling and root planning [SRP]. However after SRP decreased values of WBC, along with elevated values of serum Albumin has been observed there by establishing a correlation between periodontitis WBC and serum Albumin levels.

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parameters of periodontal diseases: 12-month results. Journal Clin Periodontol 2000; 27:30.

**CONFLICT OF INTEREST:**

THE AUTHOR HERE BY DECLARE THAT, THERE IS NO CONFLICT OF INTEREST IN THE CONDUCTED STUDY.