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Effect of Non-Surgical Therapy on W.B.C. Count in Generalised Chronic Periodontitis Patients

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Abstract

Background: Periodontitis is one of the most common diseases in humans. Since the local inflammatory and infectious nature of periodontitis is well known, many studies have focused on the interaction between the pathogenic bacteria and the host response. Even the importance of leukocytes in leukocyte formula point to the presence of infection and inflammation, which can be the risk factors for systemic conditions and diseases. The importance of leukocytes and their count in different levels of periodontitis severity have not yet been investigated. Thus, the aim of the present study is to investigate and compare the W.B.C. count in patients of generalised chronic periodontitis pre and post non surgical treatment.

Method: 20 patients were selected for the study with generalised chronic periodontitis, all with no systemic diseases and had not undergone any periodontal therapy 6 months prior to study. Pre and post nonsurgical periodontal therapy W.B.C. count estimation was done.

Results: In all 20 patients, W.B.C. count decreased after treatment. Pre therapy mean of W.B.C. count was 8889 cells/mm^3 and post therapy mean was 6765 cells/mm^3. P-value was 8.86 whereas table value was $p > 2.09$.

Keywords: Chronic periodontitis, Inflammation, Leukocytes, Non surgical therapy, W.B.C. count.

Introduction:

Periodontitis is one of the most common disease in humans.[1] It is a chronic infectious condition of the supporting tissues of teeth.[2] Bacteria with varying pathogenicity have been identified and correlated with various forms of periodontitis.[3] It has been shown that periodontal bacteria or their products can directly invade the periodontal tissues, through the ulcerated pocket epithelium around the teeth and gain access to the systemic circulation.[4] Since the local inflammatory and infectious nature of periodontitis is well known, many studies have focused on the interaction between the pathogenic bacteria and the host response.[3] For thousands of years, blood has been regarded as an ultimate body fluid that could indicate disease process. In the past decade, there has been a renewed interest in the ways in which periodontitis may affect changes in cellular and molecular components of peripheral blood.[5] It is currently unknown whether periodontal disease affects haematological variables.[3]

Few studies have analysed haematological variables in periodontitis patients and the results were contradictory.[3] Even the importance of W.B.C. in leukocyte formula (Differential white blood cell count) points towards the presence of infection and inflammation, which can be the risk factors for systemic conditions and diseases. The importance of W.B.C. and their count in different levels of periodontitis severity have not been investigated yet.[6] W.B.C. has also been associated with atherosclerosis in a number of epidemiological

studies and is considered to be a risk factor for the disease[7] and none of the studies dealt with the post therapy effect of W.B.C. count after non-surgical therapy in patients of generalised chronic periodontitis.

Thus, the aim of the present study is to investigate and compare the W.B.C. count in patients of generalised chronic periodontitis before and after non surgical treatment.

Materials and Methods:

Source of Data:

All patients visiting the outpatient department of Department of Periodontics & Implantology, Rama Dental College, Hospital & Research Center, Lakhanpur, Kanpur, Uttar Pradesh, India were screened and 20 patients were selected for the study.

Inclusion criteria:

- Age 30-55 years.[8]
- Both males and females.[2]
- Pocket depth more than or equal to 4 mm in atleast 30% of sites.[8]
- No periodontal therapy for the last 6 months prior to study.[8]

Exclusion criteria:

- Patient with systemic disease.[1, 2, 3, 6]
- Pregnancy and lactation.[2, 3, 1.]
- Smokers.[2]
- Recent extraction and tooth trauma.[1]
- Immunological disorders.[2]

Clinical parameters:

The following indices were recorded using UNC-15 probe.[2]

- Gingival index (Loe and Sillness, 1963).
- Plaque Index (Sillness & Loe, 1964).
- Bleeding on probing.
- Probing pocket depth.
- Clinical attachment level.

Study Design:

The clinical study protocol consisted of full mouth supra and sub-gingival scaling and root planing, if required. Oral hygiene instructions were also given. After taking informed consent from the patient, blood sample was taken and sent for W.B.C. count estimation. Estimation was done using semi-automatic analyzer (NEXZEN, Span diagnostics). Scaling of patient was done using ultrasonic scaler (EMS, mini piezon) and root planing was done using Gracey curettes (Hu-friedy, China). Patient was recalled after 14 days. W.B.C. count estimation was again done and compared with pre therapy counts.

Blood sampling:

Venous blood samples were drawn from anticubital vein by venipuncture using a standard 2-ml syringe from each subject and sent for haematological analysis. The blood samples were taken at baseline and then again 14 days after treatment. The blood samples were analysed using semi-automatic analyzer.

Statistical Analysis:

Comparison between baseline and post therapy W.B.C counts was made on individual subjects and then computed across the subjects. Parametric method was utilized for statistical analysis .W.B.C. counts were compared using Paired ‘t’ test.

Results:

Results show that in all 20 patients W.B.C. count decreased after treatment. Level of significance was found to be 5% i.e.; out of 20 patients 95% shows statistically significant decrease in W.B.C. count post therapy while in rest 5% there was no significant decrease in W.B.C. count after therapy. Pre therapy mean of WBC count was 8889 cells/mm^3 and post therapy mean was 6765 cells/mm^3. P-value was 8.86 whereas table value was $p > 2.09$. Mean values of gingival and plaque score pre and post therapy are shown in table below.

Mean values	Pre therapy	Post therapy
Gingival index score	2.3	0.4
Plaque index score	1.5	0.38
W.B.C. count	8889 cells/cm^3	6765 cells/mm^3

Discussion:

Epidemiological studies suggest that periodontitis is associated with an increased risk of systemic diseases like cardiovascular diseases, cereberovascular ischemia, and atherosclerosis. Pre-term low birth weight of infants has also been associated with destructive periodontal diseases.[9] These associations indicate that periodontitis has systemic effects and most likely signs of systemic inflammation may be present.[1]

Any infection in the body leads to increase in W.B.C. count.[10] In this study, infections related to systemic disease were excluded. Even among oral infections all other infections, were excluded except generalised chronic periodontitis. Patients were subjected to scaling and root planing, if required. W.B.C. count were evaluated after 14 days of the non surgical therapy and compared with the W.B.C. count at baseline as the average life span of leukocytes is 14 days.

Also, gingival index and plaque indices were repeated post therapy which shows reduction in plaque scores and gingival scores as the patient started maintaining oral hygiene after oral hygiene instructions and inflammation got subsided after non surgical therapy.

Result showed that there is marked decrease in W.B.C. count after non surgical therapy. Patients with raised W.B.C. count came within normal range after treatment. The patients with W.B.C. count with higher level of normal range came to lower level of normal range of W.B.C. count.

Activation of the immune system and inflammation may be detected by an increase in a number of markers, including white blood cell count and to date, there is some evidence from prospective studies in Pima Indians and other populations to support the hypothesis that altered markers of inflammation, such as a high W.B.C., plasma fibrinogen, PAI-1, gamma globulin, and lower albumin concentrations are associated with the later development of type 2 diabetes.[11]

In an inflamed periodontal tissue, the cellular and molecular mechanism are interconnected, so that such interactions and consequences are not restricted to periodontal tissue only, they also cause systemic effects.[12] Thus increase in W.B.C. count could be cause for cardiac problem, Type 2 diabetes and atherosclerosis. By reducing the W.B.C. count, the risk for these diseases can be reduced.

In his review paper Loos (2005) presents current knowledge on the levels of selected markers of inflammation in periodontitis. The changes in blood parameters in periodontitis are modest and often do not exceed the normal reference values. However, analogous to other infectious inflammatory diseases, it is conceivable that the chronically, slightly elevated, or depressed systemic markers (e.g., haemoglobin) in blood exacerbate other ongoing inflammatory processes in other organ systems and this way perhaps increase the risk for atherosclerosis, leading to cardiovascular and cerebro-vascular events.[5]

Thus, the hypothesis was drawn that the periodontal infection could be the cause of increase in W.B.C. count in systemically healthy patients. After alleviating the periodontal infection, decrease in W.B.C. count is seen. So, the patients chosen were systemically healthy with no other foci of infection other than generalised chronic periodontal disease. After alleviating the periodontal infection, decrease in W.B.C. count is seen.

Conclusion:

In conclusion, the present study shows a positive correlation of severity of periodontitis along with increase in the W.B.C. count. The W.B.C. count decreased after non surgical treatment of generalised chronic periodontitis. As increase in W.B.C. count can act as risk factor for many systemic diseases, so to avoid the risk of systemic disease, non surgical therapy should be advocated.

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