



Effect of Periodontitis and Cavities on the Haematological and Haemostatic Mechanism of the Male Subjects in Ogwa Mbaitolu Imo State Nigeria

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ABSTRACT

The potential haematological and haemostatic effects associated with periodontitis and cavities diseases were investigated in the subjects. Blood sample was collected from the sick subjects and used in investigations.

Results showed that periodontitis disease decreased haemoglobin concentration, packed cell volume, platelet count, increased white blood cell count (WBC), Neutrophils percentage but has no significant effect on the haemostatic parameters viz bleeding time, prothrombin time, partial thromboplastin time kaolin.

The decrease in haemoglobin concentration and packed cell volume for a period of time could result to anaemia and neutrophilia in the sick subjects. Periodontitis has an association with increase WBC count and in turn it is a risk factor for cardiovascular disease.

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INTRODUCTION

Periodontal disease otherwise known as gum disease is an infection of the gums and the bone that supports the teeth. It can also be said to be inflammation and infection of the tissues that support the teeth. The infection damages the soft tissue around teeth and establishes itself as a result of inflammatory response to plaque.

It is the general description applied to the inflammatory response of gingival and surrounding connective tissue to the bacterial or plaque accumulations of the teeth.

The tooth surfaces are normally unique in that they are only the part of the body not subject to metabolic turnover. Once formed, the teeth are indestructible, yet in the living individuals. The integrity of the teeth is assaulted by a microbial challenge so great that dental infectious rank as the most universal affliction of human kind (Dzink et al, 1988).

Periodontitis occurs when the plaque- induced inflammatory response in the tissue results in actual loss of collagen attachment of the tooth to the bone, to loss of bone and to deep periodontal pockets (pathologic loss of tissue between the tooth and the gingiva, creating spaces that are filled by dental plaque) which in some cases can extend to the entire length of the tooth root.

Etiology and pathogenesis of periodontal disease

The most important new finding concerning periodontal disease is the realization that these clinical entities are really specific infections. These infections are unusual in that massive or even obvious bacterial invasion of the tissues is rarely encountered. Rather, bacteria in the plaque touching the tissue elaborate various compounds such as H_2S , NH_3 , amines, endotoxins, enzymes (such as collagenases) and antigens, all of which penetrate the gingival and elicit inflammatory response. This inflammatory response although protective, appears to be responsible for a net loss of periodontal supporting tissue and leads to periodontal pocket formation, loosening of teeth and eventual loss of teeth.

Cavities form when acids in ones mouth wear down (erode) one's tooth's hard outer layer (enamel). Cavity is a hole in a tooth that develops from tooth decay (Emenuga 2025).

The purpose of this study is to determine the effect of periodontitis and cavities in the haematological and haemostatic mechanism of the subjects in Ogwa Mbaitolu Imo State Nigeria.

Haemostasis is a process of arrest of blood loss (Guyton, 2006). Whenever a vessel is damaged haemostatic activity is activated by successive mechanism involving vascular spasm, formation of platelet plug and growth of tissues into the blood clot to close the vessel permanently.

In the case of vascular spasm, immediately when a blood vessel is cut, the trauma to wall itself causes the vessel to contract. This instantaneously reduces the flow of blood from the cut vessel. The more the vessel is traumatized the greater is the degree of spasm. This means that a sharply cut blood vessel usually bleeds much more than vessels ruptured by crushing.

MATERIALS AND METHODS

Subjects:

Forty-eight (48) subjects consisting of male subject living in Mbaitolu imo State attending crown Dental Centre were selected for this study. The control group one consists 18 subjects while Group 2 are 30 sick subjects.

Collection of blood samples for study:

5.0ml of blood sample was collected from each subject and shared into two (2) containers Viz 2.0ml in EDTA bottle for haematological tests and 3.0ml placed in sodium citrate bottle for haemostatic mechanism tests.

Haematological tests

The packed cell volume estimation was done by simple method of microhaematocrit centrifugation method (Alexander and Griffiths 1993)

- The total white blood cell count and differentials were determined by method of Baker (1985)
- The platelet count estimation was done by the method of Brecher and Cronkite (1950)
- The bleeding time was carried out by method of Dejana (1982)
- The prothrombin time test was carried out by the method of Quick one stage method (1985)
- The partial thromboplastin time Kaolin test was carried out by the method of Quick (1985)

Statistical analysis

The results obtained from the study were represented as mean and standard deviation (mean $\pm$ S.D) while student s'-t-test was used to compare the result of the control and tests. A P-value of less than or equivalent to ($P < 0.05$ or $P = 0.05$) was considered statistically significant.

RESULTS:

The results obtained in this study were represented in tables 1 and 2 respectively:

Table 1: Haematological and Haemostatic profile of control subjects and periodontitis male subjects

Group	Hbg/l $\pm$ S.D	PCV % $\pm$ S.D	Platelet count $\times 10^9/L \pm$ S.D	Bleeding Time (Min) $\pm$ S.D	Prothron bin Tim (Min) $\pm$ S.D	Partial thrombo plastin Time (Min) $\pm$ S.D
Group one (1) control subjects n= 18	14.6 $\pm$ 2.7	43 $\pm$ 4.0	280 $\pm$ 5.2	3.0 $\pm$.03	8.2 $\pm$ 0.5	20 $\pm$ 3.2
Group Two (2) periodontitis subjects n= 30	10.6 $\pm$ 1.2	31.0 $\pm$ 0.5	192 $\pm$ 2.0	6.2 $\pm$ 0.2	10.4 $\pm$ 0.2	25 $\pm$ 2.1
P value	P<0.05	P<0.05	P<0.05	P<0.05	p>0.05	P>0.05

Table 2: White blood cell counts and differentials in control subjects and periodontitis subjects

Groups	WBC MM ³ $\pm$ S.D	N% $\pm$ S.D	L% S.D	E% $\pm$ S.D	M % $\pm$ S.D	B % $\pm$ S. D
Group one (1) control subjects n=18	5,180 $\pm$ 64	57 $\pm$ 3.0	40 $\pm$ 2.2	2 $\pm$ 0.1	1 $\pm$ 0.3	0 $\pm$ 0
Group two (2) periodontitis and cavities subjects n = 30	15,720 $\pm$ 40	80 $\pm$ 2.0	15 $\pm$ 0.5	1 $\pm$ 0.1	4 $\pm$ 0	0 $\pm$ 0
P value	P< 0.05	P<0.05	P<0.057	P>0.05	P<0.05	P>00

DISCUSSION

The discomfort caused by periodontitis and cavities and their enormous cost gives dental diseases prominence despite their life threatening nature.

The effects of periodontitis and cavities in the haematological and haemostatic mechanisms of the male subjects in Ogwa Mbaitolu Imo State Nigeria have been studied.

The determination of the haematological and haemostatic profile provides physiological information on a proper blood assessment of the body (Ita, 2007). In this study, the male subjects having periodontitis and cavities recorded decrease in haemoglobin concentration (Table 1) P<0.05, decrease in platelet count (P<0.05), decrease in packed cell volume (P<0.05) compared to their corresponding controls. Also in the haemostatic parameters, there was increase in the bleeding time in the sick subjects

(Table 1). The result is 6.2 $\pm$ 0.2 min in periodontitis subjects compared to the corresponding control which gave 3.0 $\pm$ 0.3 mins. The prothrombin time was slightly prolonged though not significant and it gave 10.4 $\pm$ 0.2 secs in the control subjects. The partial thromboplastin time kaolin in the periodontitis subjects (Table 1) gave 25 $\pm$ 2.1 secs compared to their corresponding control which gave 20 $\pm$ 3.2 secs (P>0.05).

The reported decrease in Hb concentrations, packed cell volume shows that periodontitis and cavities could interfere with normal eating habits, reduce appetite as a result of pain and aches in the affected tooth and

this could predispose to anaemia in the subjects. Anaemia by definition is a state of lower than normal concentration of hemoglobin which can also result from low PCV (Oguwike et al, 2010).

The results of prothrombin time and partial thromboplastin time showed a slight increase in the sick subjects, this could be due to poor presence of calcium ion which is usually got from animal bones we chew and periodontitis subjects cannot chew bone.

The result of white blood cell counts and the differentials indicated that Neutrophils were increased in table 2, 80 $\pm$ 2.0 (P<0.05) compared to their corresponding control which gave 57 $\pm$ 3.0%, the white blood cell count in the group 2 gave 15,720 $\pm$ 40/mm³ while it is 5,180 $\pm$ 64 counts/mm³ in the control subjects. Leucocytes have a wide range of biological effects, some of which protect against vascular diseases while some are damaging (Al-Rasheed, 2012). WBC count is associated with several cardiovascular disease risk factors

Periodontal infection leads to biofilm formation, inflammation and attachment loss. Continued inflammation results in signaling of fibro blasts and production of proinflammatory cytokines in the tissues. Antibodies specific to oral bacteria circulate in the peripheral blood.

The acute-phase response becomes activated and c-reactive protein (CRP) fibrinogen and complement are produced both by local cells and within the liver cells. These proteins may further exacerbate the local inflammatory response.

Platelet count in this research was found to be decreased in the periodontitis subjects 192 ± 2.0 compared to their corresponding control $280 \pm 5.2 \times 10^9/L$. Though the decrease is within the normal range, it indicates that platelet count has no much significant role in periodontal disease.

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