

Treatment and Effectiveness of Diseased Periodontitis with Iron Deficiency

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Abstract Anemia is a very common condition in which the blood does not have an adequate amount of healthy red blood cells. Over time, this can result in reduced oxygen flow to the body's organs. Most people know that anemia can cause symptoms such as fatigue, dizziness, lightheadedness, fast heartbeat, and skin pallor. However, many do not realize that anemia can also have a direct effect on a person's oral health. If not properly managed, anemia can cause long-lasting damage to your teeth, gums, throat, and mouth.

Keywords Chronic periodontitis, Active in depolymerization of extracellular matrix, Anti-inflammatory cytokines, and DNA damage

1. Introduction

Chronic periodontitis is a worldwide disease that has a bacterial etiology and is characterized by an inflammatory process that leads to the destruction of the soft and hard tissues that support the teeth. The severity of the pathological process can vary depending on many factors. Recently, the role of reactive oxygen species (ROS) in the pathogenesis of periodontitis has been identified. Although ROS play an important role in normal metabolic reactions, they are highly toxic and destructive in nature. Their potential source is phagocytic cells, predominantly polymorphonuclear leukocytes (PMNL).

The aim of this study was to assess the periodontal status of patients with iron deficiency anemia (IDA) and the correlation of changes in serum and gingival cleft fluid (GCF) ferritin levels after periodontal therapy. 19 female patients with anemic hematological indicators were classified into group A and 20 healthy women with normal hematological indicators were classified into group B. After receiving group A, patients with gingival indicators similar to group B were included in group B.

At the initial and 3-month follow-up visit, clinical periodontal indices and hematological parameters were recorded and GCF samples were taken. All patients underwent scaling after a session to improve oral hygiene, and areas with a depth greater than 4 mm received root planning. All measurements and analyzes were repeated during the 3-month follow-up visit. During the follow-up period, all clinical parameters decreased in both groups

($P < 0.05$), but the gingival index in group A did not change. GCF ferritin concentrations showed statistically significant decreases ($P < 0.05$), but the total amount of ferritin in GCF did not change.

No significant correlation was found between serum and GCF ferritin levels. The results of this study showed that changes in serum ferritin levels were not associated with GCF ferritin levels and were not a direct risk factor for IDA periodontitis. As a result of stimulation with bacterial antigens, PMNs produce and release a large amount of ROS, which leads to increased oxidative damage to the gingival tissue, periodontal ligament, and alveolar bones. ROS are active in depolymerization of extracellular matrix components, lipid peroxidation, oxidation of enzymes such as antiproteases, induction of anti-inflammatory cytokines, and DNA damage.

Periodontal health is the foundation of good prevention and restorative dentistry. However, the periodontium the disease is prevalent in a large proportion of the Scottish population, as confirmed by epidemiological studies¹. Half of people with severe toothache have gingivitis and/or periodontitis, including a significant minority with evidence of progressive disease. One of the most common Dental treatment performed in Scotland is a simple cleaning and polishing of the gums. Anyway, less than 10% of patients receive more intensive therapy intended to treat There is a significant difference between them in patients with moderate to severe periodontitis. Health Tips. The reasons for this are multifactorial and complex, but both practitioners may be involved. And patient factors. Most patients with moderate to severe periodontal disease receive adequate treatment at the initial stage. Care Seeking a specialist or secondary care is the appropriate way in the most severe

cases. Parodontitis. However, there are concerns about reluctance to treat advanced disease. The number of unsolicited referrals in primary health care has increased. Recommends interviews with doctors Directional factors include distrust among general dentists (GPs). periodontal treatment, the time required for the effective treatment of periodontal diseases and the need to rely on the patient as an active partner in the treatment process. Medical and legal Advocacy unions report that a growing number of allegations stem from unidentified claims and treatment of periodontitis. All organisms have a range of enzymatic and non-enzymatic antioxidant (AO) systems that are biological agents against ROS-mediated harmful oxidation reactions.

The main AO enzyme involved in the regulation of tissue damage mediated by ROS is superoxide dismutase (SOD). It removes harmful ROS by catalyzing the dismutation of two superoxide radicals into hydrogen peroxide and oxygen and can be found in extracellular and intracellular compartments. The SOD family includes cytosolic Cu, Zn-SOD, mitochondrial Mn-SOD, and extracellular Cu, (EC-SOD). Cytosolic EC-SOD Cu shows a homologous sequence known to Zn-SOD but has a glycosylated structure. It is located in the extracellular matrix of tissues and is very suitable for preventing cell and tissue damage initiated by extracellular ROS.

Oxidative stress is involved in the pathogenesis of many systemic diseases, including rheumatoid arthritis, chronic obstructive pulmonary disease, acquired immunodeficiency syndrome, and atherosclerosis [7,8,9,10]. Iron deficiency anemia (IDA), the most common malnutrition worldwide, is also associated with increased oxidative stress. Iron deficiency causes tissue hypoxia and affects the production of iron-containing AO proteins, which shifts the balance towards the oxidative side. It has been suggested that the relative reduction of oxygen in tissues in anemia is a modifying factor under the influence of local irritation of the periodontium. A number of environmental, physical and psychosocial factors can alter periodontal tissue and host immunity leading to relatively severe periodontal disease. It should be noted that these disorders and conditions do not cause periodontitis, but may predispose, accelerate or exacerbate its development. In addition, periodontal diagnostics is aimed at identifying high-risk groups for the development of destructive periodontal diseases. Although our understanding of the risk factors associated with periodontitis has expanded, identifying groups and individuals at risk for developing periodontal disease still remains one of the biggest challenges in managing patients with periodontitis.

The objectives of this study were twofold: (1) to investigate the extent to which the presence of IDA affects the weight of CP, and (2) to compare local (saliva) and systemic (serum) SOD activity in IDA patients, CP and IDA and CP in healthy individuals.

Significant activity of active oxygen radicals can lead to disruption of normal cell functions and the integrity of cellular structures. Oxidative stress in biological systems can

result from the consumption and/or overload of AO by oxidants, in which case the level of AO is insufficient. Oxidative stress is determined by assessing the products of oxidative damage to lipids, proteins and DNA, or by analyzing individual AO compounds individually or in groups, or by measuring the overall capacity of AO. Determining the activity of one or another AO enzyme, we assessed its significance for one or another pathogenic process, for example, in our study, we determined the activity of the SOD enzyme, which significantly protects AO from ROS hyperproduction in both CPs. and IDA.

A review of the available literature shows only one study involving IDA and CP. To our knowledge, this is the first published study evaluating the relationship between salivary and serum SOD activity levels between chronic periodontitis and iron deficiency anemia.

In patients with chronic periodontitis, when the changes in the oral cavity were accompanied by a state of iron deficiency, the hygiene index was very high until the complex treatment was 3.2 ± 0.12 . After complex treatment with glycodent gel and ferrous sulfate II (sorbifer durules / ascorbic acid) in the standard treatment of periodontitis, the OHIS index was 1.36 ± 0.3 and changed to a reliable positive ($P < 0.05$) compared to pre-complex treatment.). Patients were observed to have a mild look and a significant reduction or complete disappearance of tartar.

In the treatment of disseminated periodontitis, the OHIS index was 3.4 ± 0.13 and 1.82 ± 0.7 , respectively, before and after treatment in the second group, where only its standard treatments were performed.

In the case of chronic disseminated periodontitis with iron deficiency, glycodent gel and iron-II sulfate (sorbifer durules / ascorbic acid) were added to the standard treatment, and the oral cavity was improved. The changes noted in Figure 3.1 below are shown diagrammatically.

So far, there have been many studies on the association of serum and salivary SOD activity levels with periodontitis, and the results are uncertain. Kim et al. report a decrease in SOD activity in saliva in patients with chronic periodontitis. The study by Baltacioglu et al. Chanakchi et al. and Akalin et al. also confirmed a decrease in SOD activity in periodontitis. In contrast, Wei et al. showed high SOD activity in saliva, serum, and gingival fissure fluid in patients with chronic periodontitis. In our study, the SOD activity of serum and saliva in patients with CP was significantly lower than in systemically and periodontal healthy individuals. SOD activity in the lower saliva can be interpreted as oxidative damage resulting from an increase in ROS/O₂ production due to the suppression of salivary/PMNL SOD production, while a decrease in serum SOD activity is associated with a possible hyperreactivity of the peripheral blood. Neutrophils are associated with ROS production in response to stimulation of Fc-gamma receptors in patients with chronic periodontitis.

In patients with IDA-LH, significantly lower SOD activity in saliva and serum was observed than in patients with primary chronic hepatitis. In a study by Amirkhizi et al., Isler

et al. [and Kurtoglu et al. also confirmed a decrease in SOD activity in patients with IDA. In contrast, the study by Acharya et al. and Hafiz et al. [31] Erythrocytes increased the activity of Cu-Zn-SOD in patients with IDA. In this study, low SOD activity in patients with anemia may be associated with increased hemoglobin autoxidation due to hypoxia, which leads to an increase in the production of superoxide and hydrogen peroxide by erythrocytes. ROS derived from these erythrocytes can damage the cell membrane and cause erythrocyte leakage. It is known that ROS, in particular hydrogen peroxide, inhibit SOD activity.

Although there was no significant difference in salivary and serum SOD activity between patients with IDA-CP and CP, the IDA-CP group had much higher baseline DAA, GI, and BP% than the CP group. similar IP values. In addition, this study showed that periodontal disease, expressed as a percentage of the area where CAL was ≥ 6 mm, was worse in patients with IDA-CP than in the CP group. The high level of periodontal destruction in the IDA-CP group may be associated with the synergistic effect of other mechanisms that exacerbate inflammation due to oxidative stress and iron deficiency anemia induced by ROS. ROS can damage periodontal tissue directly by destroying components of the extracellular matrix of periodontal tissue, or indirectly by activating latent enzymes such as collagenase and gelatinase and inactivating enzyme inhibitors such as metalloproteinases, the matrix may play an indirect role in enhancing the degradation of the extracellular matrix. with metalloproteinase. inhibitor of α -1-antiproteinas. In addition, subsequent disruption of ROS production and tissue redox status can modulate the expression of various immune and inflammatory molecules by redox transcription factors (eg, nuclear factor KB), indirectly leading to tissue damage and inflammation. leads to an increase.

We also used the CPITN index recommended by WHO experts to assess the state of periodontal tissues in our dispensary observation. During the examination, each patient revealed the most negative indicators of the degree of periodontal tissue damage (high code recorded during the examination) and the total number of damaged sextants. Subsequently, the prevalence and intensity of pathological symptoms during the examination were calculated according to the registered data. When studying the results of the CPITN index, the following three indicators of change were noted: bleeding gums, the presence of superficial and / or lower tartar, pockets of different depths (5-6 mm or more), indicating the state of periodontal tissues. In chronic iron-deficient periodontitis, glycodent gel and combined iron-II sulfate-sorbifer durules/ascorbic acid in the complex treatment of patients in group I before and after treatment,

the CPTIN index was 2.58 ± 0.3 and 1.2 ± 0 , respectively. 1 (P < 0.05). The results have changed for the better.

In the treatment of group II, i.e. periodontitis, only with standard treatment this indicator was 2.48 ± 0.3 and 1.8 ± 0.4 , respectively.

Chronic periodontitis was associated with iron deficiency, and after complex treatment of patients with glycodent-gel and combined iron-II sulfate - sorbifer durules / ascorbic acid, papillary-marginal-alveolar parameters were reduced by 4.4 times. These figures confirm a significantly positive change in the state of the oral cavity after complex treatment (P < 0.05).

In the second group, i.e., in patients who received only standard treatment of chronic periodontitis, these indicators decreased by 92.3 ± 0.7 and 34.3 ± 0.7 , or 2.69 times, respectively. Although these numbers showed a positive change in the positive direction, R < 0.05, it was significantly lower than in the first group.

The study of the state of microcirculation in the periodontium with a combination of chronic periodontitis with iron deficiency anemia showed the following.

In addition, IDA has been shown to increase inflammation through a number of mechanisms. During the examination, each patient was identified with the most negative indicator of the degree of periodontal tissue injury (high code recorded in the examination) and the total number of injured sextants. Subsequently, the prevalence and intensity of pathological symptoms were calculated when examined according to the recorded data. When studying the results of the CPITN index, the following three indicators of change were noted: bleeding gums, the presence of gums on the upper and / or lower gums, pockets of different depths indicating the condition of periodontal tissue.

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