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IMMUNOLOGICAL AND CLINICAL STUDY OF PERIODONTITIS AMONG PATIENTS WITH CHRONIC KIDNEY DISEASE IN BABYLON PROVINCE

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Abstract:

This study was conducted in the city of Al- Hilla for the period from October 2022 and July 2023 including the collection of Gingival Crevicular Fluid (GCF) from 60 periodontitis with chronic kidney disease patients and 30 healthy controls. The levels of Interleukins (IL-6) and (IL-18) in GCF was measured using (ELISA) enzyme-linked immunosorbent assay method. Dental status of Decayed and Missing owing to caries, and Filled in the permanent Teeth (DMFT), Plaque (PI) and gingival bleeding (GI) indexes.

The results showed a statistically significant increase of (IL-6) and (IL-18) in comparison with the control group, and this means that there is an immune response in chronic kidney disease patients despite their reduced immunity due to high inflammation.

Plaque index PI, Gingival index GI, caries index DMFT for Chronic kidney disease with periodontitis patients showed a high significant increase at $P \leq 0.05$.

Keywords:

INTRODUCTION

People with chronic kidney disease (CKD) may have more oral illness, and because of its links to inflammation and malnutrition, It could be a risk factor for mortality and cardiovascular illness. (Ruospo *et al.*, 2014).

Patients with CKD experience oral tissue problems, which worsens their dental health. These results show elevated plaque levels, gingival irritation, and a faster formation of calculus. (Costantinides *et al.,* 2018). chronic periodontitis, an inflammatory disease of the tooth-supporting structures with the destruction of support tissues of periodontal, increased mobility of tooth, leading at the end tooth loss occurs. When compare to control group participants, patients that have chronic periodontitis have raised levels of inflammatory markers and increased systemic inflammation. (Mohan *et al.,* 2014).

The damaging inflammatory process that affects the tooth's supporting tissues in periodontal disorders, which are chronic infectious illnesses, results in the resorption of alveolar bone, the development the periodontal pockets, then eventually loss the tooth. (Nazir,2017)

The encumbrance of oral disease may be elevated at patients have (CKD) because people with chronic diseases usually have higher unmet oral healthcare needs and diminished usage of dental services. (Griffin et al., 2009).

The (GCF) Gingival Crevicular Fluid represents serum exudate that originates from gingival tissues' microcirculation and runs inside gingival sulcus (periodontal pocket) containing inflammatory mediators and tissue metabolic byproducts (Hanes and Krishna 2010).

The multifunctional cytokine IL-6 is participants in a variation of biological processes, such as the proliferation of t cell Lymphocyte also B lymphocyte differentiation, and the prompt of B lymphocyte immunoglobulins (Igs) production. (Hirano *et al.*,1990).

The pro-inflammatory cytokine IL-18, is released through many calls type like antigen-presenting cells, Kupffer cells, monocytes, macrophages also non-immune cells, such as cells intestinal and bronchial epithelial types. (Biet *et al.*,2002).

OBJECTIVE

Investigate the immune status by Study the levels of the Interleukins (IL-6) and (IL-18) in GCF was measured using (ELISA) enzyme-linked immunosorbent assay for individuals have dental caries among patients with chronic kidney disease. And record Intraoral examination Dental status of Decayed and Missing owing to caries, and Filled in the

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permanent teeth (DMFT), Plaque (PI) and gingival bleeding (GI) indexes.

METHODS

This study was conducted between October 2022 and July 2023 in Murjan Teaching Hospital and Imam Al-Sadiq Hospital, after Oral clinical Examination for 60 periodontitis with Chronic kidney disease patients (30 males and 30 females of mean age 39 years) and 30 healthy individuals then Collection of (GCF) from both.

GCF was collected using paper points (size 30) that were put into the objected teeth ,held for 30 seconds, and then removed. Blood-stained paper was disqualified. Following the collection of GCF, phosphate buffer saline (300 microliters) is added to the paper point that has been put in Eppendorf tubes. The paper point was removed after the GCF had been extracted from it through the centrifugation for 15 minutes at 3000 rpm, the GCF sample were maintained at -40°C until analysis. (Escalona *et al*. ,2016).

Examination of patients Agreeing to the World Health Organization's recommended standards, the dental status total of Decayed and Missing owing to the caries, and Filled Teeth in the permanent teeth (DMFT) is determined using visual inspection with a dental mirror.

Interleukins (IL-6) and (IL-18) at GCF was measured using (ELISA) enzyme-linked immunosorbent assay, using kits from Elabscience. (PI) Plaque index and (GI) Gingival bleeding indices , they used to quantify the of dental hygiene and gingival inflammation degree respectively.

Data collection in case sheet including the gender of the patient, age, gingival index and antimicrobial prophylaxis, other diseases …etc

STATISTICAL ANALYSIS

The SPSS (statistics package for social science) application At this investigation used . Standard deviation (SD) was used to represent all data as mean ± SD. When comparing between two groups, the t-test was employed, the statistical significance were judged to exist when the levels of *p*.value less or equivalent to 0.05, while statistical non-significant if the *p*.value more than 0.05. (Daniel, 1999).

RESULTS

IL-6 and IL-18 levels of GCF , Sixty periodontitis have Chronic kidney disease patients and thirty Healthy Control subjects seem to be governed by the intensity of periodontal inflammation, Table (1) and Fig (1,2) show High significant differences for IL-6 and IL-18 levels between periodontitis with CKD and Control groups at P ≤ 0.05 by using t-test.

Table (1) : Immunity biomarkers in GCF of periodontitis have Chronic kidney Disease patients in addition to Healthy Control

Parameter	Chronic kidney disease with periodontitis (mean ±SD) NO.=60	Healthy Control (mean ±SD) NO.=30	P-value
IL-6 (ng/mL)	*3.14±0.842	0.71±0.21	0.0001
IL-18 (pg/mL)	*121.72 ±42.51	26.38±11.83	0.0001

* Statistically High significant at p ≤ 0.05

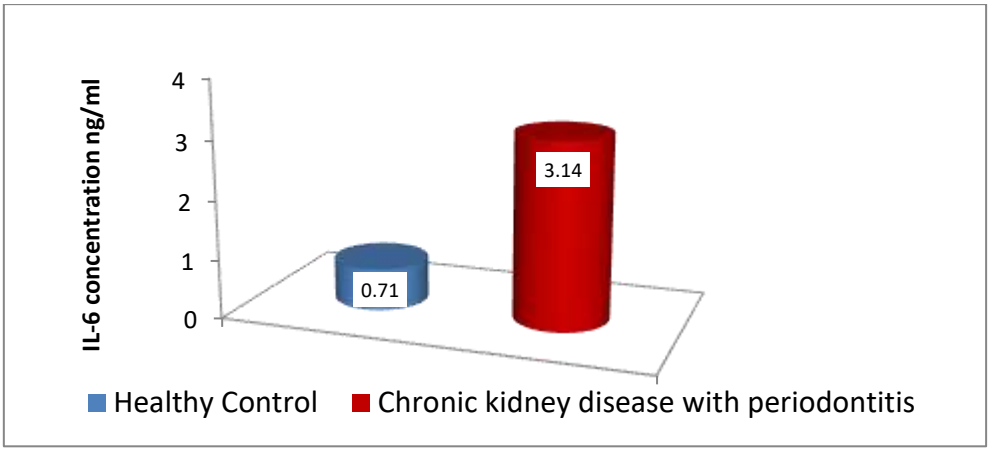

Fig. (1) : Level of IL-6 at GCF for Chronic kidney disease with periodontitis patients and Healthy Control

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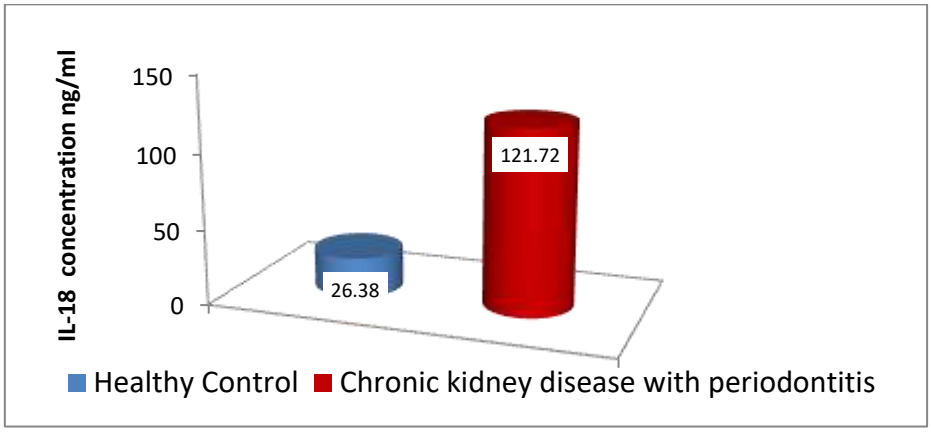

Fig. (2) : Level of IL-18 in GCF for Chronic kidney disease with periodontitis patients and Healthy Control

Plaque index PI, Gingival index GI, caries index DMFT for Chronic kidney disease with periodontitis patients showed a high significant increase at P ≤ 0.05 by using t-test when it compared with the healthy group at table (2).

Table (2) : Association between Plaque index , Gingival index , caries index for Chronic kidney disease with periodontitis patients and Healthy Control

Case	GI (Mean ± SD)	PI (Mean ± SD)	DMFT (Mean ± SD)
Chronic kidney disease with periodontitis patients (n=60)	*2.224±0.86	*2.29±0.062	*4.74±1.472
Healthy Control (n=30)	0.21±0.03	0.253±0.092	1.5±0.629
P. value	0.0001	0.0001	0.0001

* Statistically High significant at p ≤ 0.05

DISCUSSION

From the search results appeared a statistically high concentration increase IL-6 in GCF for Chronic kidney disease with Periodontal patients . That agreed with Choudhury (2010) ; Erdemir *et al.* (2010).

Several diverse types of cell, encompass the macrophages, monocytes, fibroblasts, endothelium, also epithelial, T- and B-cells, and keratinocytes, generate Interleukin 6, Additionally the expression of IL-6 at range of circumstances including inflammatory and host immunological responses. (Okada and Murakami,1998).

It has been found that periodontal tissues with disease produce more IL-6 than healthy tissue. (Takahashi *et al.*, 1994; Dongari-Bagtzoglou and Ebersole., 1998).

There be present also a significant high rise concentration of IL- 18 at GCF for Chronic kidney disease with periodontitis patients. That agreed with Nair *et al.*(2016)

Due to its several functions and greater expression in gingival samples with larger sulcular depth, IL-18 may have a regulatory role in the inflamed gingival tissue. (Johnson and Serio, 2005).

Additionally, it has found that (GCF) IL-18 levels are greater at areas where gingivitis and periodontitis are present, indicating a connection among the intensity of periodontal breakdown and local flow of IL-18. (Orozco *et al.,* 2006).

Given the clinical context, several studies suggested that individuals with chronic periodontitis had more relevant local IL-18 levels than those with inflammation of gum at locations with comparable pocket depths. (Figueredo *et al.*, 2008).

Due to the immunological environment, IL-18 have unique ability for trigger either the Th1 or Th2 differentiation. (Nakanishi *et al.*,2001).

GI determine the amount and severity of gingival inflammation Based on an assessment of the gingival color, shape, and bleeding (Loe and Silness,1963).

The DMFT index was significantly higher among chronic kidney disease with periodontitis patients as compared with the control group. That agreed with Ruospo *et al.* (2014).

The missing teeth are considered fundamental reason of increase DMFT in severity of types of periodontal disease , which is why high DMFT score was attributed to missing teeth. (Beklen *et al.*,2022).

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CONCLUSION

Elevation in the levels of GCF of interleukins 6 and interleukin 18 are directly related to the rise levels of the inflammation in periodontal tissues for CKD patients.

populations have CKD, oral illness may provide a serious health risk. There is still a need for more investigation to determine the influence of oral health on the patient level the population, in addition to patient priorities for care, viewpoints, and cost . In CKD, periodontitis may increase the chance of death.

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