

# The Biochemical Effects of Non-surgical Periodontal Therapy in Patients with and without Chronic Renal Disease

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*Recent studies have shown an association between high levels of biomarkers and periodontitis, association which decreases after the periodontal treatment. Because of this association with systemic inflammatory response, chronic periodontitis was recently included as a risk factor for chronic renal disease. Specifically, in this study we hypothesized that a part of chronic inflammatory response observed in patients with chronic renal disease is due to physiopathological reactions caused by the presence of chronic periodontitis, which, during the course of its evolution, induces an increase in the expression of inflammatory markers. Patients were divided into two groups: the first group consisted of patients with chronic renal disease and periodontal disease who were undergoing periodontal treatment (test group) and the second group, control group, composed of patients without any systemic disease, but who experienced moderate to severe chronic periodontitis, also periodontal treated. Blood samples were taken for biochemical analysis at baseline and at 3 months after periodontal therapy. Venous blood was collected in vacuum tubes between 7:00 am and 9:00 am after 12 hours after the last meal. A tube containing EDTA was analyzed for blood following parameters: albumin, uric acid, creatinin, urea. An association between periodontal disease and renal disease is often found in studies using a population where the renal disease is already diagnosed. In these cases, duration of renal end stage and type of topical and systemic treatment administered to patients significantly affect the association. Therefore, we have shown that periodontitis may promote any detectable changes in renal function. Thus, by analogy, in this study the test groups and control groups were compared not only with each other but also comparative analyzes were performed based on the reference values of markers of renal dysfunction. We think it could be plausible existence of a causal link between periodontal disease and chronic renal disease both by glomerular invasion by periodontal pathogens, directly and indirectly through systemic inflammatory effect caused by chronic periodontitis. Success of periodontal therapy reduce systemic inflammatory response and decreases levels of biochemical markers indicating that this may be an important intervention therapy in patients with chronic renal disease.*

**Keywords:** renal disease, biomarkers, periodontal disease, laboratory test, periodontal therapy

Chronic renal disease is considered a global public health problem, mainly because of the high morbidity and mortality.

Periodontitis is a inflammatory chronic immune disease caused by Gram-negative bacteria that destroy the tissues supporting the teeth, and inducing local inflammation being associated with a systemic inflammatory response [1-3]. Recent studies have shown an association between high levels of biomarkers and periodontitis, association which decreases after the periodontal treatment. Because of this association with systemic inflammatory response, chronic periodontitis was recently included as a risk factor for chronic renal disease [4].

The fundamental idea of the study is based on the fact that the main purpose of patients with chronic renal disease management at present and in the future is to ensure a *normal life* full and independent. Recovery integration means, specific of medicine, according to results of the studied analysis parameters, will ensure the success of multidisciplinary therapy approach to the management of these patients [5-9].

Specifically, in this study we hypothesized that a part of chronic inflammatory response observed in patients with chronic renal disease is due to physiopathological reactions caused by the presence of chronic periodontitis,

which, during the course of its evolution, induces an increase in the expression of inflammatory markers.

## Experimental part

### Materials and methods

This study was conducted in the Specialty Ambulatory of Emergency Hospital St. Andrew Galati, Department of Nephrology. Also the study was done in collaboration with the Department of Periodontology of the Faculty of Dental Medicine of the University Gr. T. Popa, Iasi.

Evaluation of oral health in patients undergoing dialysis occurred in the hospital (for non-transportable patients), in the Department of Periodontology and in own private practice from Galati. All patients who had a diagnosis of chronic periodontitis received periodontal treatment.

Patients were divided into two groups: the first group consisted of patients with chronic renal disease and periodontal disease who were undergoing periodontal treatment (test group) and the second group, control group, composed of patients without any systemic disease, but who experienced moderate to severe chronic periodontitis, also periodontal treated.

This study included patients over 18 years old who have not received in the last 6 months any periodontal, antimicrobial or anti-inflammatory treatment, and have not used steroids or immunosuppressive drugs.

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Blood samples were taken for biochemical analysis at baseline and at 3 months after periodontal therapy. Venous blood was collected in vacuum tubes between 7:00 am and 9:00 am after 12 h after the last meal. A tube containing EDTA was analyzed for blood following parameters: albumin, uric acid, creatinin, urea.

For comparisons between the group with chronic renal disease and the control group was used student t-test for independent samples or Mann-Whitney nonparametric test. For comparison before and after the periodontal therapy it have used the t-test or Wilcoxon signed rank test. Analyses were performed using SPSS 13.0 computer program V.

## Results and discussions

Patients in the study groups were homogeneous demographic characteristics and periodontal therapy was the only variable in both groups. It is important to emphasize that no patient did not use statins or iron replacement therapy during the study. The study was conducted from March 2013 to August 2014 and was completed after participants monitoring was complete.

It is noted that the percentage of men is 63% and is significantly higher than women in the group with chronic renal disease. In the control group the percentage of men (55%) is lower than in the group without chronic renal disease but still predominant (fig.1 and 2).

For serum albumin, the average value before periodontal treatment is 4.90 g / dL for the group of patients without

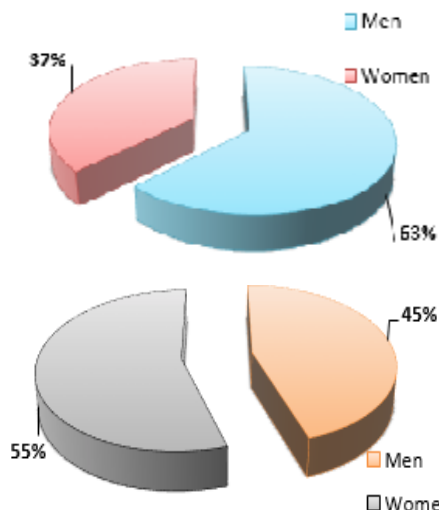


Fig. 1. The percentage of patients from test group by gender

Fig. 2. The percentage of patients from the control group by gender

renal disease and 3.70 g / dL for the group of patients with renal disease. The average values after periodontal treatment, are relatively enlarged and inverted for groups of patients studied, measuring 5.40 g / dL for the group of patients without renal disease and 4.15 g / dL for the group of patients with renal disease.

In the case of serum creatinine, the mean periodontal treatment before and after the show is respectively 0.60 g / dL for the group of patients without renal disease and 0.75 g / dL for the group of patients with renal disease. Mean before periodontal treatment, are relatively increased

Fig. 3. Serum markers - before and after initial periodontal treatment

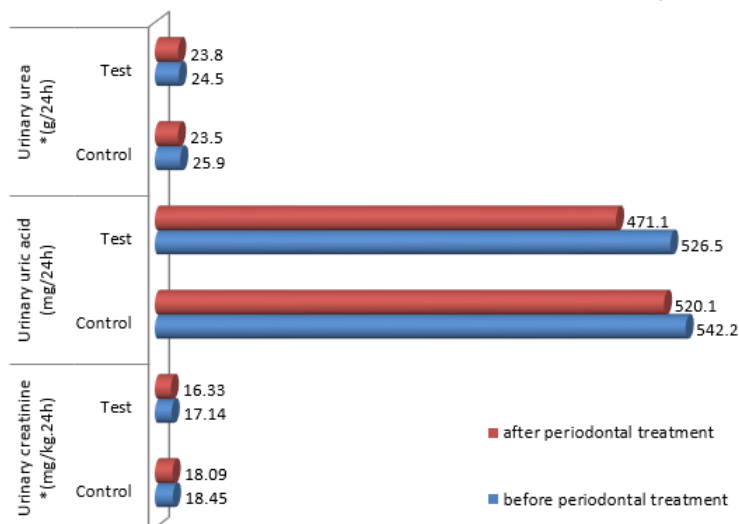
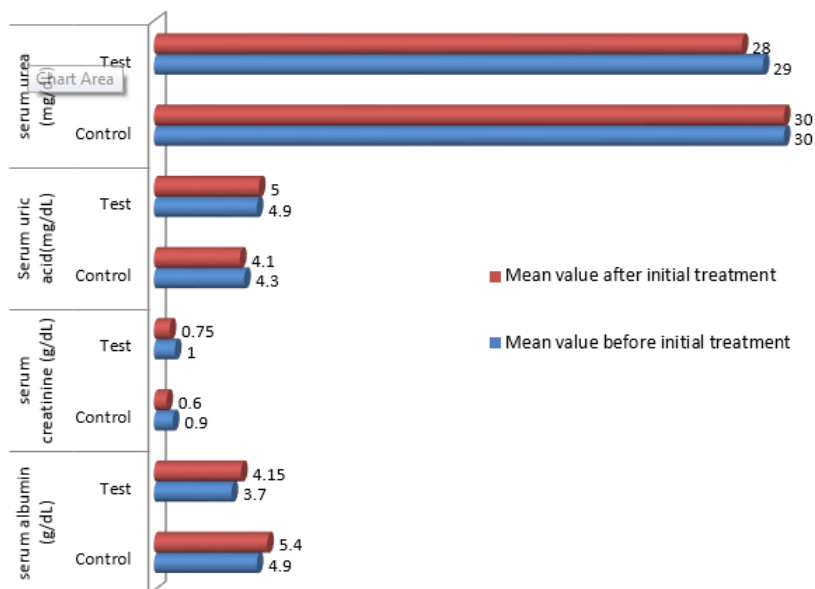


Fig.4. Urinary markers - before and after initial periodontal treatment

for groups of patients studied, measuring 0.90 g / dL for the group of patients without renal disease and 1.00 g / dL for the group of patients with renal disease (fig.3).

For urinary uric acid, the mean values before periodontal treatment are respectively 542.2mg / dL for the group of patients without renal disease and 526.5 mg / dL for the group of patients with renal disease. Values are relatively reduced after periodontal treatment for groups of patients studied, with values of 520.1 mg / dL for the group of patients without renal disease and 471.1 mg / dL for the group of patients with renal disease.

For the urinary urea, the average value before periodontal treatment is 25.9 g / 24h for the group of patients without renal disease (control) and 24.5 g / 24h for the group of patients with renal disease. The average values after periodontal treatment, are 23.5 g / 24h for the group of patients without renal disease and 23.8 g / 24h for the group of patients with renal disease (fig.4).

This study evaluated the impact of periodontal therapy on biochemical markers and led for the first time a causal association between periodontal disease activity and their level. We included 56 patients with chronic periodontitis, 36 with chronic renal disease and 20 without systemic disease and with normal renal function (control group). [1,3,6,7]

Markers were evaluated before and 3 months after periodontal treatment. The effectiveness of periodontal treatment was confirmed by biochemical parameters improvement [10, 11].

An association between periodontal disease and renal disease is often found in studies using a population where the renal disease is already diagnosed. In these cases, duration of renal end stage and type of topical and systemic treatment administered to patients significantly affect the association. Therefore, we have shown that periodontitis may promote any detectable changes in renal function. Thus, by analogy, in this study the test groups and control groups were compared not only with each other but also comparative analyzes were performed based on the reference values of markers of renal dysfunction [13, 14]

We think it could be plausible existence of a causal link between periodontal disease and chronic renal disease both by glomerular invasion by periodontal pathogens, directly and indirectly through systemic inflammatory effect caused by chronic periodontitis.

Further investigations are necessary in order to discover periodontal pathogens and/or level of biochemical markers before and after periodontal treatment in people with renal disease.

## Conclusions

Our findings suggest that periodontal disease is more severe in patients with chronic renal disease and induce a systemic inflammatory response.

Success of periodontal therapy reduce systemic inflammatory response and decreases levels of biochemical markers indicating that this may be an important intervention therapy in patients with chronic renal disease.

Considering that chronic inflammation is a risk factor for atherosclerotic diseases, cardiovascular patients with hypertension and diabetes, leading causes of chronic renal disease, it is plausible that immediate diagnosis of periodontal disease, followed by periodontal therapy should be an important preventive measure in chronic renal disease in daily clinical practice.

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