Salivary IgA in chronic kidney disease patients undergoing hemodialysis in Missan governorate

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ABSTRACT

Background: Chronic kidney disease is a worldwide health problem, with adverse outcomes of cardiovascular disease and premature death, can be divided into five stages, depending on how severe the damage is to the kidneys, or the level of decrease in kidney function, the final stage of chronic kidney disease is called end-stage renal disease, salivary immunoglobulin A is the main immunoglobulin found in mucous secretions, including tears, saliva, colostrum and secretions from the genitourinary tract gastrointestinal tract, prostate and respiratory epithelium. It is also found in small amounts in blood.This study aimedto measuresalivary flow rate and salivaryimmunoglobulin Alevels in chronic kidney disease patients on hemodialysis treatment in comparison with healthy control subjects.

Materials and Methods: Ninety (90) subjects were participated in this study; 45 Patients undergoing hemodialysis with chronic kidney diseases; 45 health control subjects. Saliva collected was measured and levels of salivary immunoglobulin A were measured by Enzyme Link Immunosorbent Assay (Elisa).

Results:The present studyrevealed that the mean value of salivary flow rate in chronic kidney disease patients was (0.34 ± 0.19) ml/min, while for healthy control subjects was (1.02 ± 0.39) ml/min, there wasstatisticallysignificantly decrease in salivary flow rate ofchronic kidney disease on hemodialysis patients as compared to control healthy subjects.The present study revealed that the (Mean±SD) of the immunoglobulin A in chronic kidney disease patients on hemodialysis (388.81±227.86) µg./ml, while in control group (273.98±155.89) µg./ml, the result revealed statistically significant increase in chronic kidney disease patients on hemodialysis as compared to control subjects.

Conclusions: Salivary immunoglobulin (IgA) reflects the functional capacity of the glands. Increased concentration of this component is usually marker of a poor general condition.

Key words: Chronic kidney disease; Hemodialysis; Salivary flow rate and salivary immunoglobulin A. (J Bagh Coll Dentistry 2015; 27(2):54-57).

INTRODUCTION

Chronic kidney disease (CKD) is a worldwide health problem, with adverse outcomes of cardiovascular disease and premature death [(1)].CKD can be divided into five stages, depending on how severe the damage is to the kidneys, or the level of decrease in kidney function, the final stage of chronic kidney disease is called end-stage renal disease (ESRD). At this stage, the kidneys are no longer able to remove enough wastes and excess fluids from the body. At this point, the patient would need dialysis or a kidney transplant [(2- 5)].

In End Stage renal Disease (ESRD) patients, the oral health could also negatively be affected by the underlying pathology, the dialysis treatment, oral dryness or an altered salivary composition [(6-8)]. Renal failure is associated with vomiting, oral malodor and xerostomia which could all affect the oral health of these patients [(9, 10)].

Immunoglobulin A (IgA, also referred to as sIgA) is an antibody that plays a critical role in mucosal immunity. More IgA is produced in mucosal linings than all other types of antibody combined [(11)], between three and five grams are secreted into the intestinal lumen each day [(12)].

IgA is the main immunoglobulin found in mucous secretions, including tears, saliva, colostrum and secretions from the genitourinary tract, gastrointestinal tract, prostate and respiratory epithelium. It is also found in smallamounts in blood. The secretory

Component of sIgA protects the immunoglobulin from being degraded by proteolytic enzymes, thus sIgA can survive in the harsh gastrointestinal tract environment and provide protection against microbes that multiply in body secretions [(13)], sIgA can also inhibit inflammatory effects of other immunoglobulin [(14)]. The high prevalence of IgA in mucosal areas is a result of cooperation between plasma cells that produce polymeric IgA (pIgA), and mucosal epithelial cells that express an immunoglobulin receptor called the polymeric Ig receptor (pIgR). pIgA is released from the nearby activated plasma cells and binds to pIgR. This results in transportation of IgA across mucosal epithelial cells and its cleavage from pIgR for release into external secretions [(15)].

Secretory immunoglobulin A (sIgA) is the most frequently found immunoglobulin in mixed saliva and is considered to be a secretory factor for acquired immunity in the oral cavity. Antibodies of this type participate in the preservation of the integrity of the oral surfaces (enamel and mucous membrane) and, through

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restriction of microbial adhesion, become part of the first line of defense. SIgA antibodies independently, or in complexes, participate in antigen-antibody reactions on the mucous membrane (and partly on the enamel too), thus limiting the penetration of bacteria and toxins [16-18].

It is clear that sIgA plays an important role in oral homeostasis and is an important indicator of the defensive status of the oral cavity, where the rich oral microbiota has antigenic potential and can stimulate secretory antibodies [19].

MATERIALS AND METHODS

Ninety (90) subjects were participated in this study, they were divided into two groups: Patients group comprised of 45 subjects undergoing hemodialysis with chronic kidney diseases; Control group comprised of 45 subjects with no history of any systemic diseases.

The Patients were excluded: Smoking; Pregnancy; Hepatitis; Malignancy.

Salivary samples were collected from the study group and the control group, were collected between 8:00 AM and 11:00 AM to minimize effects of the diurnal variability in salivary composition. Samples were collected before meals or at least 2 h after meals. After giving instruction to wash the oral cavity with distal water to remove any debris, unstimulated whole saliva was collected by spitting method, to avoid influence of stress on the secretion rate, all patients were told to rest for 10 minutes before the registration of the salivary flow rate. During the period of collection the individuals were comfortably seated in a ventilated and lighted room. The saliva was collected for exactly (5minutes). All subjects were asked to achieve a passive flow of saliva without masticatory movements for 5 minutes, timed with a stop watch. Then the volume of each saliva sample was measured and the flow rate ml/5min. was calculated, Salivary flow rate= volume of saliva per ml/Time per minute.

Then sample were put in small cooling box after collection to stop the growth of bacteria, the samples centrifuged at 4000 rpm for 15 minutes. The supernatant aspirated and stored together in deep freezer at -20 C until the other parameters were analyzed.

Saliva collected was measured and level of sIgA was measured by enzyme immunosorbent assay (Elisa).

RESULTS

Table (1) and figure (1) revealed that the mean value of salivary flow rate in CKD patients was (0.34 ± 0.19) ml/min, while for healthy control subjects was (1.02 ± 0.39) ml/min, the salivary flow rate in CKD on HD patients was significantly decrease than in the control healthy subjects.

The present study revealed that the (Mean±SD) of the sIgA in CKD patients on HD (388.81±227.86) µg./ml, while in control group (273.98±155.89) µg./ml, this result revealed statistically significant increase in CKD patients on HD as compared to control subjects as shown in table (2) and figure (2).

Table 1: Mean ±SD of salivary flow with t-test between CKD patients on HD & control group

Parameter		No.	Mean ±SD	SE	Range	t-test	P-value
Salivary flow rate	Patients	45	0.34 ± 0.19	0.03	0.1 - 0.8	10.24	0.01 (S)
	control	45	1.02 ± 0.39	0.06	0.5 - 2.2		

S: Significant at p<0.05

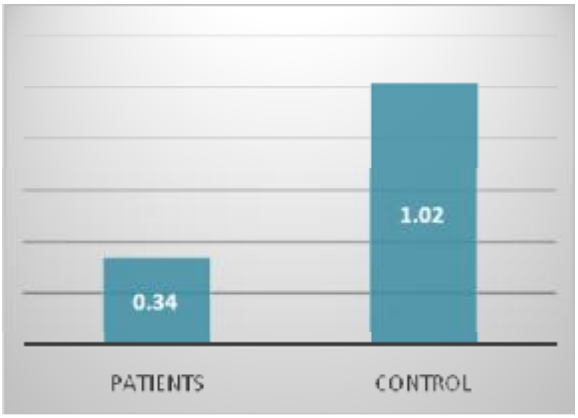

Figure1: Mean of salivary flow rate in CKD patients on HD and healthy control group.

Table 2: Mean ±SD of salivary IgA with t-test in CKD patients on HD & control subjects.

		N	Mean ±SD	SE	Range	t-test	P value
S IgA	Patients	45	388.81 ± 227.86	33.9	113.92 - 1063.32	2.79	0.05 (S)
	Control	45	273.98 ± 155.89	23.2	125.43 - 638.81		

(S): Significant at p<0.05

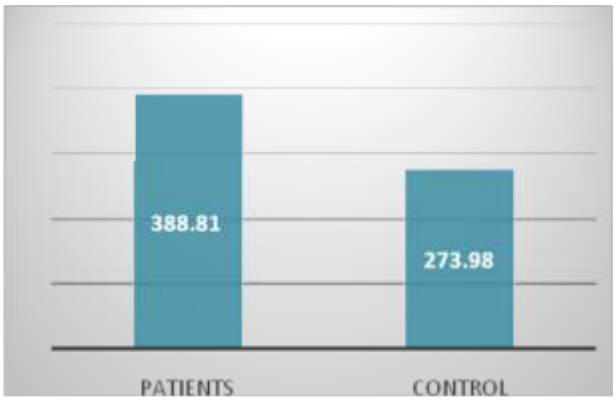

Figure 2: Mean of Salivary IgA levels in patients & control groups.

DISCUSSION

The lower flow rates of both unstimulated and stimulated whole saliva can be attributed to direct uremic involvement of the salivary glands leading to decreased parenchymatous and excretory functions, and as a result of dehydration due to restriction in fluid intake. Acute stress levels in these patients may also possibly reduce the salivary flow rate [20, 21].

In the present study, unstimulated whole SFR values in the HD (0.34 ± 0.19) group were significantly lower than those in health control (1.02 ± 0.39), this finding in agreement with previous reports [22-27].

Only a few studies exist in which saliva of HD patients had been investigated, salivary immunoglobulin may be used as a marker of general oral inflammatory state. Salivary IgA is considered to belong to the first line of defense of the host against pathogensin saliva via binding to soluble and particulate antigens as well as it inhibits various enzymes and bacterial colonization on oral hard surfaces [28]. The logistic regression analysis identified the patient age, the number of concomitant diseases and the low salivary flow rate values as explaining variables for the highest tertiles of salivary protein concentrations [29].

Salivaryimmunoglobulin (IgA) reflects the functional capacity of the glands. Increased concentration of this component is usually marker of a poor general condition [30-34].

In present study increase salivary IgA level as compared to apparently health control showed significantly differences, no previous study could be traced in Iraq to compare the present result with.

In a study carried out by bots et al in Netherland, this study showed that HD has significant acute effects on both salivary secretion rate and protein concentrations in saliva. The total protein concentration decreased significantly comparing before and after dialysis [35]. Level of sIgA does not influence the total protein concentration in saliva, suggesting that the salivary glands maintain a normal function and no basement membrane defect seems to be present in HD patients [36].

Another a study carried out by Vesterinen in Finland, for oral health was assessed from the predialysis stage through to dialysis and post transplantation stage, The sIgA concentrations were highest in the dialysis stage, The urea concentration of saliva was high in all stages After kidney transplantation a decrease in sIgA concentration, was logical and probably due to the immunosuppressant medications taken and to decrease in plasma urea [37].

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