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ORIGINAL ARTICLE

Evaluation of Interleukin 8 gene polymorphism for predicting inflammation in Indian chronic kidney disease and peritoneal dialysis patients

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KEYWORDS

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Abstract *Background and aim:* Previous studies have observed the association between inflammation and chronic kidney disease (CKD). The role played by Interleukin 8 (IL8) gene polymorphism has not been studied yet. Hence, the present study has been designed as the first attempt to identify the possible associations between polymorphism of the IL-8 gene and patients with diabetic CKD and on continuous ambulatory peritoneal dialysis (CAPD).

Materials and methods: A total of 150 participants were selected from a private nephrology outpatient clinic. The subjects were divided into three groups: healthy individuals without any renal complications (group 1, control, $n = 50$), patients with diabetic chronic kidney disease of stages 3 and 4 (group 2, $n = 50$) and CAPD (group 3, $n = 50$). Blood deoxyribo nucleic acid (DNA) isolated from the members of the study group, was confirmed by agarose gel electrophoresis and primers specific for IL8 gene were designed, using primer3 software tool.

Results: Restriction digestion of the amplicons with *Escherichia coli* restriction enzyme I (*EcoRI*) ended up in 203 base pairs (bp) band in control and 108 bp band in all diabetic and non-diabetic CKD. This indicated the presence of polymorphism in +781 Cytosine/Thymine (C/T) of IL-8 gene in diabetic CKD and CAPD patients. Statistical analysis of the distribution of frequencies of alleles C and T by chi square test confirmed the presence of polymorphism at +781 C/T of IL-8 gene in patient groups compared to control.

Conclusion: The polymorphism in +781 C/T of IL-8 gene studied in this work suggests its possible role as an inflammatory marker for both chronic kidney disease and CAPD.

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1. Introduction

As indicated by world health organization (WHO) Worldwide disease burden task, infections of the kidney and urinary tract add to worldwide burden with around 850,000 passings consistently and 115,010,107 inability balanced life years.[1] CKD is the twelfth driving reason for death and seventeenth reason for disability. For quite a while, it has been assumed that about 100,000 new patients with ESRD in India require renal substitution treatment consistently in view of information from tertiary referral centers.[2,3] The reported pervasiveness of CKD was 0.86% in the study population and 1.39% in the control district in Chennai when assessed amid counteractive action program began at group level.[4] The commonness of ESRD seems, by all accounts, to be 785 for every million population in India. Peritoneal dialysis (PD) is for some time built up as a noteworthy choice for renal replacement therapy in patients with end-stage renal infection or stage five of CKD. The essential intricacy of PD is infection due to the presence of a permanent tube in the abdomen. Continuous ambulatory peritoneal dialysis (CAPD) is one of the sorts of PD where the patient can do the exchanges himself three to four times each day. Inflammation contributes to the progression of CKD by inducing the release of cytokines and the increased production and activity of adhesion molecules, which together contribute to T cell adhesion and migration into the interstitium, subsequently attracting pro-fibrotic factors. Inflammation in CKD also causes mortality from cardiovascular disease by contributing to the development of vascular calcifications and endothelial dysfunction.[5]

The inter individual variability in developing CKD might be because of polymorphisms of various genes encoding cytokines and other mediators of inflammation. Interleukin-8 (IL-8), a chemokine furthermore alluded to as neutrophil initiating peptide-1 and monocyte-inferred neutrophil chemotactic component, is combined as a 99-amino acid antecedent, discharged after cleavage of a single sequence of 20 residues, and handled by rehashed N-terminal cleavage yielding several biologically active variants.[6,7,41] Some IL-8 single nucleotide polymorphisms (SNPs) including +781C/T (rs2227306) were affirmed to be identified with the transcriptional level of IL-8[8] and might be connected with the event or advancement of an assortment of sicknesses.[9–13]

Past studies have noticed the relationship between inflammation and CKD,[14] but the relationship between these two has not been studied yet in point of interest as for IL-8; however, IL-1, IL-6 and IL-10 are understood as inflammatory markers connected with CKD.[15] Subsequently, the present case-control study was outlined as (to the best of our insight) the main endeavor to recognize conceivable relationship between polymorphism of the IL-8 gene and patients with CKD and on CAPD regimen in the number of inhabitants in Tiruchirappalli.

2. Materials and methods

2.1. Study subjects

A total of 150 participants were recruited from a private nephrology outpatient clinic and their clinical parameters are given in Table 1. The subjects were divided into three groups: patients with chronic kidney disease (group 1, $n = 50$) with various stages according to the National Kidney Foundation classification[16]: Stage I (GFR > 90 ml/min/1.73 m^2) normal kidney function but urine findings or structural abnormalities or genetic trait points to kidney disease ($n = 05$), stage II (60–89 ml/min/1.73 m^2) mildly reduced kidney function ($n = 10$), stage III (30–59 ml/min/1.73 m^2) moderately reduced kidney function ($n = 10$), stage IV (15–29 ml/min/1.73 m^2) severely reduced kidney function ($n = 18$) and stage V (< 15 ml/min/1.73 m^2) end stage kidney failure ($n = 17$); patients on dialysis (CAPD) (group 2, $n = 50$), healthy individuals without any renal complications (group 3, control, $n = 50$). The clinical characteristics of study population are given in Table 1. The following inclusion criteria were considered for the present study: (i) 18 years of age or older, (ii) estimated glomerular filtration rate (eGFR) between < 15–89 mL/min/1.73 m^2 for CKD group, (iii) adult CAPD patients ⩾18 years and at least 3 months experience on CAPD, (iv) willing and able to comply with clinic visits and study-related procedures and (v) provide signed informed consent and exclusion criteria were as follows: (i) recent infection or hospitalization (within one month), (ii) history of active or chronic hepatitis B, history of active or chronic hepatitis C, human immunodeficiency virus (HIV), (iii) history of tuberculosis (patient must be purified protein derivate negative), (iv) patients taking tumor necrosis factor (TNF) inhibitors, TNF blocker, interleukin-6 (IL-6) blockers or interleukin-1 (IL-1) blocking drugs, (v) having clinically significant chronic lymphopenia (low white blood cell count), and (vi) history of

Table 1 Clinical parameters for study population.

Parameters	Diabetic CKD	CAPD	Control
Age in years	61.37 ± 12.98	58.2 ± 9.78	56.54 ± 11.9
BMI	23.96 ± 3.06	21.63 ± 4.18	20.93 ± 4.73
Bl.Glucose (mg/dl)	180.45 ± 36.03	127.83 ± 11.62	118.86 ± 11.17
Bl.Urea (mg/dl)	99.6 ± 48	91. 11 ± 53.20	22.1 ± 15.9
S.Creatinine (mg/dl)	4.60 ± 2.45	5.9 ± 1.29	1.32 ± 0.62
S.Sodium (meq/dl)	135.85 ± 10.98	137.66 ± 9.50	139 ± 5.95
S.Potassium (meq/dl)	3.96 ± 1.97	4.36 ± 1.75	4.1 ± 0.95
S.CRP (mg/dl)	6.48 ± 3.47	6.80 ± 2.83	1.06 ± 0.88
Total cholesterol (mg/dl)	241.63 ± 37.83	239.10 ± 27.53	192.88 ± 33.71
Triglycerides (mg/dl)	224.20 ± 23.19	218.81 ± 21.67	167.04 ± 32.0
HDL (mg/dl)	27.6 ± 5.6	26.4 ± 4.93	34.5 ± 4.3
LDL (mg/dl)	186.4 ± 29.12	187.9 ± 31.50	146.72 ± 22.61

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