



SERUM CYSTATIN C IN PRE AND POST HEMODIALYSIS PATIENTS COMPARED TO HEALTHY INDIVIDUALS

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ABSTRACT

Serum cystatin C is an emerging parameter to assess kidney function. Its utility in assessing the adequacy of hemodialysis in patients with chronic kidney disease has however not been established with certainty. The current study was carried out to evaluate serum cystatin C and serum creatinine in pre and post hemodialysis patients, as well as to investigate a possible correlation between serum cystatin C and creatinine. There are few studies on the effects of cystatin C on hemodialysis patients. A total thirty-five patients with twenty normal subjects were included in this study. All patients were diagnosed with chronic kidney disease (pre and post- hemodialysis). ELISA (enzyme linked immune sorbent assay) technique was used for measurement of serum cystatin C. Serum creatinine was determined by using colorimetric method. The results showed that the level of serum cystatin C were significantly higher ($p < 0.001$) in the post-hemodialysis patients as compared with the pre-hemodialysis patients and healthy subjects measured of cystatin C in pre and post hemodialysis would help to monitor the overall clinical status of patients.

KEY WORD: Cystatin C, pre-hemodialysis and post-hemodialysis.

INTRODUCTION

Cystatin C is a 122-amino acid, 13-kDa protein that is a member of a family of competitive inhibitors of lysosomal cysteine proteinases. Its functions include involvement in extracellular proteolysis, modulation of the immune system, and antibacterial and antiviral activities^[1]. Cystatin C has several properties that make it a good candidate marker of GFR, including a constant production rate regulated by a “housekeeping” gene expressed in all nucleated cells, free filtration at the glomerulus, complete reabsorption and catabolism by the proximal tubules with no reabsorption into the bloodstream, and no renal tubular secretion^[1]. Cystatin C is a better marker of GFR than serum creatinine because of its independence from age and gender^[2]. It is hypothesized that serum cystatin C levels are influenced by the method and intensity of dialysis received^[3]. Dialysis efficiency greatly influences the well-being, outcome and survival of patients with chronic renal disease. Presently, the efficacy of dialysis is assessed by estimating serum creatinine and serum cystatin C^[4].

SUBJECTS & METHODS

Subjects: a total of fifty five subjects were included in this study. Thirty-five patients were diagnosed as chronic kidney disease with (pre and post hemodialysis) with an age range between (30-45) years and a mean of (36.7±

4.68). All of them were collected from Baghdad teaching hospital (dialysis unit). The remaining twenty subjects were normal healthy individuals with an age range between (30-44) years and a mean of (35.9± 4.63).

This study involved normal level of body mass index (BMI) for the two groups (patients and controls). ELISA (enzyme linked immune sorbent assay) technique was used for measurement of serum cystatin C. colorimetric method was used in the determination of serum creatinine.

RESULTS

The study included 35 patients with chronic kidney disease who undergo dialysis and 20 healthy controls. Table (1) showed the numbers and the range of the parameters. Table (2) showed the clinical characteristics of the patient group and control. The mean ± SD of age of patients were (36.7 ± 4.68), while (35.9 ± 4.63) value of age of controls. The same table also showed the mean ± SD value of serum cystatin C in post-hemodialysis patients (6.1± 1.58) were highly significant compared to pre-hemodialysis (1.68 ± 0.44) and controls (0.31 ± 0.05) $p < 0.0$. The mean ± SD of serum creatinine (9.11 ± 2.78) in pre-hemodialysis patients were significantly higher than that obtained from post-hemodialysis (2.0 ± 0.24) and controls group (1.1 ± 0.47) $p < 0.001$.

The characteristics of hemodialysis patients and controls are shown in tables 1 & 2

Parameters	Hemodialysis patients			
Number	N= 35		N=20	
Age	30 - 45 years		30 – 44 years	
Sex	Male	Female	Male	Female
	20	15	11	9
BMI	24.02 kg/m ²		22.40 kg/m ²	

TABLE 2:

Parameters	Pre-hemodialysis patients	post-hemodialysis patients	P. value	
Age	36.7 ± 4.68	36.7 ± 4.68	35.9 ± 4.63	
Cystatin C (mg/l)	1.68 ± 0.44	6.1 ± 1.58	0.31 ± 0.05	<0.001
Creatinine (mg/dl)	9.11 ± 2.78	2.0 ± 0.24	1.1 ± 0.47	<0.001

Values are expressed as mean±SD; P<0.0

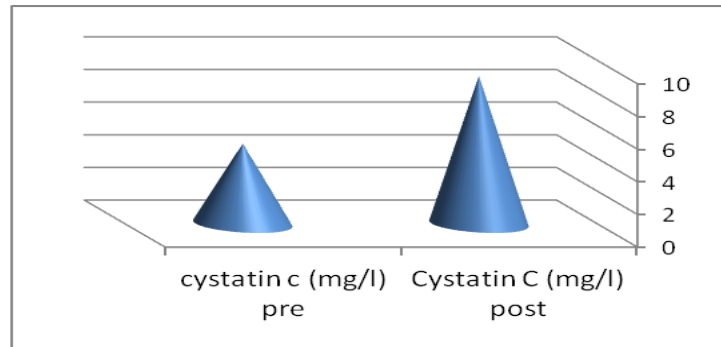


FIGURE 1: serum cystatin C level in pre and post hemodialysis patients.

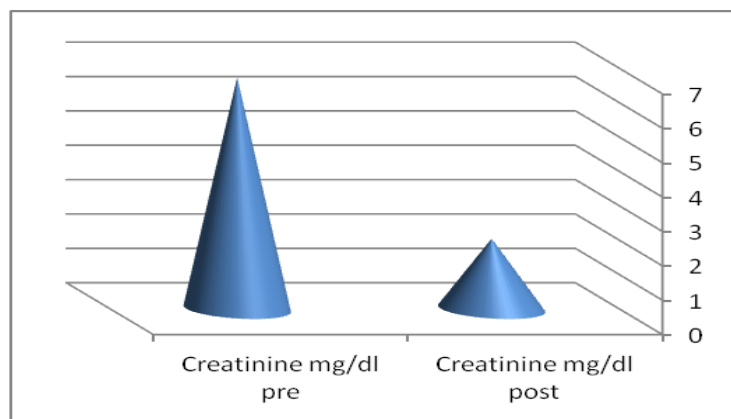


FIGURE 2: serum creatinine level in pre and post hemodialysis.

DISCUSSION

In the current study, serum creatinine was used as an indicator of renal failure; however, it was recently reported that cystatin C was more sensitive and detectable earlier than serum creatinine and blood urea nitrogen^[5]. Serum creatinine is a widely used yet crude marker of GFR. The limitations of serum creatinine and creatinine clearance for estimation of GFR are well known^[6]. Creatinine concentration is affected by several factors that are independent of GFR, such as age, race, muscle mass, gender, medication use, and catabolic state^[7]. Tadashi, et al., 2010^[8] demonstrated that serum cystatin C is eligible as a predictor of renal dysfunction and as an indicator of dialysis patients. The elevated in the serum cystatin C after dialysis may cause by many reasons such the components of dialyzing fluid and the nature of dialyzing membrane^[9]. Cystatin C is highly positive charged and this charged of Cystatin C might prevent its filtration. The fall in serum creatinine in post dialysis patients is because of the magnitude of reduction of this metabolite during dialysis [10, 11].

CONCLUSION

Serum cystatin C significantly predicted renal dysfunction. Cystatin C considered more sensitive and detectable than creatinine for kidney dysfunction. Measurement of serum

cystatin C in hemodialysis patients might help to the overall clinical status of the patients.

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