Research Article

Cystatin C level as a Predictor of kidney function in Essential Hypertensive Patients

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Introduction
Essential hypertension remains a major modifiable risk factor for cardiovascular disease (CVD) despite important advances in our understanding of its pathophysiology and availability of effective treatment strategies. High blood pressure (BP) increases the risk of CVD for millions of people worldwide, and there is evidence that the problem is only getting worse. Aim of the work : The aim of this study was to investigate the value of serum cystain C concentrartion for the detection of impaired renal function in patients with essential hypertensive. Evaluate for correlations between Cys C and serum Creatinine Mesurments. Compare Cys C and Cr GFR formulas with Cr Cl. Patients and Methods: Subjects: The study population included 90 subjects, were attending the out patient clinic of nephrology and urology university hospital in the period from August 2016 to December 2017. Results: This study was conducted on 90 persons our selected from our outpatient clinic and outpatient clinic of minia nephrology and urology university hospital . All subjected were divided into two groups according to creatinine clearance using creatinine clearance equation. Discussion: CKD is a worldwide public health problem. There is an increasing incidence and prevalence of patients with kidney failure requiring replacement therapy, with poor outcomes and high cost. Recommendations: Cystain C should be standard investigation in hypertensive patients for evaluation of renal function. A new equation is needed for detection of GFR in hypertensive patients taking in consideration inclusion of serum cystain C level. Cystain C should be considered as an important prognostic factor in hypertensive patients and further studies are needed for evaluation of using cystain C as a marker of controlling blood pressure.
Keywords: Anti-Diuretic Hormone, Acute Kidney Injury, Alanine Aminotransferase

Introduction
Essential hypertension remains a major modifiable risk factor for cardiovascular disease (CVD) despite important advances in our understanding of its pathophysiology and the availability of effective treatment strategies. High blood pressure (BP) increases the risk of CVD for millions of people worldwide, and there is evidence that the problem is only getting wors[(1)].

Essential primary, or idiopathic hypertension is defined as high Bp in which secondary causes such as renovascular disease, renal failure, pheochromocytoma , aldosteronism, or other causes of secondary hypertension or mendelian forms (monogenic) are not present. Essential hypertension accounts for 95% of all cases of hypertension. Essential hypertension is a heterogenous disorder, with different patients having different causal factors that lead to a high BP. Essential hypertension needs to be separated into various syndromes because the causes of high Bp in most patients presently classified as hiving Essential hypertension can be recognized[(2)].

Cystain C or Cystain 3 (formerly gamma trace, post –gamma-globulin or neuroendocrine basic polypeptide), aprotein encoded by the CST3 gene, is mainly used as a biomarker of kidney function. Recently, it has been studied for its role in predicting new-onset or deteriorating cardio-vascular disease, all cells with a nucleus (cell core containing the DNA) produce cystatin C as a chain of 120 amino acids. It is found in virtually all tissues and body fluids. It is a potent inhibitor of lysosomal proteinases (enzymes from a special subunit of the cell that break down

proteins) and probably one of the most important extracellular inhibitor of cysteine proteases (it prevents the breakdown of proteins outside the cell by specific type of protein degrading enzumes). Cystatin C belongs to the type 2 cystatin gene family [3].
Serum creatinine, the most widely used marker, do not adequately reflect renal dysfunction and may underestimate renal impairment in patients with liver cirrhosis. Decreased hepatic production of creatine, reduced muscle mass, and malnutrition account for an increased gap between serum creatinine levels and the actual renal function[4].

Isotopic renal scans are also expensive; they cannot be used for repeated measurements that are needed in such patients. Creatinine clearance tends to overestimate the GFR and requires accurate urine volume measurement based on serum creatinine, Cockcroft-Gault formula and modification of diet in renal disease (MDRD) equations are of limited value in cirrhotic patients; they overestimate the GFR as well. Recently, the protease inhibitor cystatin C has been suggested as a sensitive marker of glomerular filtration rate and as an early indicator of impaired renal function, possibly superior to serum creatinine[5].

Aim of the work

The aim of this study was to investigate the value of serum cystatin C concentration for the detection of impaired renal function in patients with Essential hypertensive.
Evaluate the correlations between Cys C and Serum Creatinine Measurments.
Compare Cys C and Cr GFR formulas with Cr Cl.

Patients and Methods

Subjects:

The study population included 90 subjects, were attending the outpatient clinic of nephrology and urology university hospital in the period from August 2016 to December 2017>

The subjects were divided in two groups:
Group I (impaired createnine clearance) patients: Which includes 65 patients 46 (70%0 females) and 19(30%) males, their ages from 37-74 years).

This group has patients with history of hypertension decrease with createnine clearance.
Group II (normal creatinine clearance) patients: Which includes 25 patients 18(72%) females patients 18(72%) females and 7(28%) males, their ages ranges from 35-69 years) This group with history of hypertension with normal creatinine clearance.

Inclusion criteria:
Patient with Bp above 140/90 and a normal serum Cr level
Exclusion criteria:
1- Thyrotoxicosis
2- Intrinsic renal disease
3- Cushing synderom & conns disease
4- Coarctation of aorta
5- Polycythemia
6- myxedema & hyperparathyroidism
7- Pheochromocytoma & Acromegally.

Results

This study was conducted on 90 persons our selected from our outpatient clinic and outpatient clinic of minia nephrology and urology university hospital. All subjected were divided into two groups according to creatinine clearance using creatinine clearance equation which are:

$$Ccr = \frac{Ucr \quad x \quad V}{Pcr}$$ (clause., 1953)

Group I (decrease creatinine clearance) patients:
Which includes 65 patients 46(70%) females and 19(30%) males, their ages ranges from (37-74 years) with a mean 57.9 ± 8.3.

This group has patients with history of hypertension decrease with creatinine clearance.

Group II (normal creatinine clearance) patients: Which includes 25 patients 18(72%) females patients 18(72%) females and 7(28%0 males, their ages ranges from 35-69 years). With a mean 54.7 ± 10.9

This group with history of hypertension with normal creatinine clearance.

	Decrease Cr Clearance (n=65)	Normal Cr Clearance (n=25)	P value
Age			
Range	(37-74)	(35 -69)	0.186
Mean ± SD	57.9±8.3	54.7±10.9	
Weight			
Range	(55-93)	(65-93)	0.115
Mean ± SD	71.3±8.9)	74.6±8.2	
Sex			
Male	19(29.2%)	7(28%)	0.908
Female	46 (70.8%)	18(72%)	
SBP			
Range	(145-190)	(140-155)	<0.001*
Mean ± SD	165.9±11	145.2±4.9	
DBP			
Range	(85-110)	(85-100)	0.007*
Mean ± SD	95.2±6.6	91.2±4.8	
ECG			
Range	32(49.2%)	25(100%)	<0.001*
Mean ± SD	33(50.8%)	0(0%)	

Independent samples t test for quantitative data between the two groups
Fisher exact test for quantitative data betweenthe two groups
*: significant level at P value <0.05

Discussion

CKD is a worldwide public health problem. There is an increasing incidence and prevalence of patients with kidney failure requiring replacement therapy, with poor outcomes and high cost. There is an even higher prevalence of patients in earlier stages of CKD, with adverse outcomes such as kidney failure, cardiovascular disease, and premature death. Patients at earlier stages of CKD can be detected through laboratory testing and their treatment is effective in showing the progression to kidney failure and reducing cardiovascular events[6].

CKD is a worldwide health crisis e.g. in the year 2005, there were approximately 58 million deaths worldwide, with 35 million attributed to chronic disease, according to the world Health Organization. According the 2010 Global Burden of disease study, CKD was ranked 27th in the list movement up the list was second only to that for HIV and AIDs[7].

It is suggested that number of patients with kidney failure will increase disproportionately in

developing countries, such as China and India, where the number of elderly people are increasing. The medical cost related to kidney disease are of course heavily influenced by the costs of hospital care dialysis and kidney transplantation. Treatment for end- stage kidney disease is very expensive[8].

Recommendations

Cystatin C should be a standard investigation in hypertensive patients for evaluation of renal function.

A new equation is needed for detection of GFR in hypertensive patients taking in consideration inclusion of serum cystatin C level.

Cystatin C should be considered as an important prognostic factor in hypertensive patients and further studies are needed for evaluation of using cystatin c as a marker of controlling blood pressure.

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