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Research Article

A study of biochemical profile of chronic renal failure patients in tertiary care hospital: a cross sectional study

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ABSTRACT

Background: Chronic kidney disease (CKD) describes abnormal kidney function and/or structure. Investigations are focused on assessment of renal function and therefore stage of CKD, identification of the underlying cause and assessment of complications of CKD. Earliest identification of any deviation can help in early intervention & prevention of morbidity & mortality.
Methods: 50 patients of CKD admitted at GG Hospital, a tertiary care hospital, Jamnagar during period of 1 year, were included. Data were collected by means of interviewing the patients and serological investigations.
Results: 24% patients had hyperglycemias & 36% patients had impaired glucose tolerance. Almost all biochemical markers were elevated. 86% (43) had High blood urea. All the patients had Serum creatinine level above the normal range for age & sex. 72% (36) patients had hyponatremia & 4% (2) patients had hypernatremia. 22% (11) patients had hypokalemia & 40% (20) patients had hyperkalemia. 38% (19) patients had hypocalcaemia & 6% (3) patients had hypocalcaemia.
Conclusions: There must be prescribed protocol for all CRF patients for estimating biochemical profile so that any complication can be identified at earliest & intervened to prevent morbidity & mortality.

Keywords: CKD, GFR, Biochemical profile

INTRODUCTION

Chronic kidney disease (CKD) describes abnormal kidney function and/or structure. There is evidence that treatment can prevent or delay the progression of CKD, reduce or prevent the development of complications, and reduce the risk of cardiovascular disease (CVD).[1]The definition of CKD is based on the presence of kidney damage (i.e. albuminuria) or decreased kidney function (i.e. Glomerular filtration rate (GFR) <60 ml/minute per 1·73 m²) for three months or more, irrespective of clinical diagnosis.[2]

CKD is common, frequently unrecognised and often exists together with other conditions (such as CVD and diabetes). The risk of developing CKD increases with age. A large primary care study (practice population 162,113) suggests an age standardised prevalence of stage 3-5 CKD of 8.5% (10.6% in females and 5.8% in males).[3]

Investigations are focused on assessment of renal function and therefore stage of CKD, identification of the underlying cause and assessment of complications of CKD.[2] Earliest identification of any deviation can help in early intervention & prevention of morbidity & mortality. Thus keeping in view above stated consideration the present study was conducted.

Assessment of renal function[4]

- Serum urea is a poor marker of renal function, because it varies significantly with hydration and diet,

is not produced constantly and is reabsorbed by the kidney.
- Serum creatinine also has significant limitations. The level can remain within the normal range despite the loss of over 50% of renal function.
- A gold-standard measurement is an isotopic GFR, but this is expensive and not widely available.
- For most purposes in primary care, the best assessment or screening tool is the eGFR - see separate Assessing Renal Function article. Most laboratories now provide an eGFR when requesting serum creatinine, which should be used in preference to the calculator above.

Biochemistry[4]
- Plasma glucose: to detect undiagnosed diabetes or assess control of diabetes.
- Serum sodium: usually normal, but may be low.
- Serum potassium: raised.
- Serum bicarbonate: low.
- Serum albumin: hypoalbuminaemia in patients who are nephrotic and/or malnourished (low levels at the start of dialysis are associated with a poor prognosis).
- Serum calcium: may be normal, low or high.
- Serum phosphate: usually high.
- Serum alkaline phosphatase: raised when bone disease develops.
- Serum parathyroid hormone: rises progressively with declining renal function.
- Serum cholesterol and triglycerides: dyslipidaemia is common.

METHODS

In the present study, 50 patients of CKD admitted at GG Hospital, a tertiary care hospital, Jamnagar during period of 1 year, were included. Patients were selected irrespective of age, sex, etiology, management or outcome with purposive sampling technique. Written informed consent form was given to the patient and if patient permitted then only recruited in study. Data were collected using a pretested Performa meeting the objectives of the study. Inclusion criteria were Age>/=19years, Non pregnant, Non HIV, Anasarca, Anaemia, Raised RFT, USG KUB finding especially CM differentiation abnormality. Exclusion criteria were Age</=18year, Pregnant female, HIV positive, ARF, Normal USG KUB findings. Term used CKD is defined as the presence of either kidney damage or Glomerular filtration rate (GFR) <60 ml/min/1.73 m^2.[5] Data were collected by means of interviewing the patients and serological investigations. As it is government centre, certain investigation was not available thus available investigations were carried out.

Ethical clearance
The study protocol was reviewed and approved by the institutional ethical committee of the institution. Prior written informed consent was taken after fully explaining the purpose of the study.

Data entry and analysis
The data entry was done in Microsoft Office Excel 2007. Analysis was done using Epi info and Microsoft office Excel 2007 & SPSS.

RESULTS

In present study of CKD patients maximum patients belonged to age group 41-60 years, i.e. 40% patients, followed by 61-80 years age group, i.e. 28% with mean age of 51.74 years. Almost same distribution among male & female patients. Majority of participants were illiterate i.e. 74%. All women participants were housewife, whereas of 48% men, 16% were labourers, 12% were farmers, 4% were doing service in public or private sectors. None of the participants belonged to upper class. 78% participants belonged to lower class & rest of them from middle class (Table1).

Table 1: Socio-demographic profile of the study population.

Characteristics	Frequency (Percentage, %)
Age groups (in years)	
≤20 years	5 (10%)
21-40 years	9 (18%)
41-60 years	20 (40%)
61-80 years	14 (28%)
≥81 years	2 (4%)
Gender	
Male	24 (48%)
Female	26 (52%)
Education Status	
Illiterate	37 (74%)
Primary	05 (10%)
Secondary	06 (12%)
Graduate	02 (4%)
Occupational	
Farmer	6 (12%)
Housewife	26 (52%)
Labourer	08 (16%)
Service	02 (4%)
Others	08 (16%)
Socioeconomic class	
Upper	0 (0%)
Middle	11 (22%)
Lower	39 (78%)

40% (20) of patients had normal PP2BS, whereas 24% (12) patients had hyperglycemia & 36% (18) patients had impaired glucose tolerance (Table 2).

Only 14% (7) patients had normal blood urea, but 86% (43) had High blood urea. Of which 20% (10) patients

Table 2: Distribution of patients according to their FBS & PP2BS level.

FBS (mg %)	Frequency	Percentage (%)
<100	17	34
100-125	17	34
≥126	16	32
PP2BS (mg %)		
<140	20	40
140-199	18	36
≥200	12	24

were in 70-100 mg% range, 20% (10) patients were in 101-130 mg% range, 12% (6) patients were in 131-160 mg% range.

All the patients had serum creatinine level above the normal range for age & sex, i.e. for male Serum creatinine level >1.2 was present in all 24 patients and for female serum creatinine level >0.9 was present in all 26 patients.

24% (12) of patients had normal serum sodium, where as 72% (36) patients had hyponatremia and 4% (2) patients had hypernatremia. 38% (19) of patients had normal serum potassium, whereas 22% (11) patients had hypokalemia and 40% (20) patients had hyperkalemia. 56% (28) of patients had normal serum calcium, whereas 38% (19) patients had hypocalcaemia and 6% (3) patients had hypocalcaemia (Table 3).

Table 4 shows distribution of participants based on their Glomerular filtration rate. Almost i.e. 60% (30) patients had GFR <15, 28% (14) patients had GFR between 15-29, 8% (4) patients had GFR between 30-59, 2% (1) patient had GFR between 60-89, 2% (1) patient had GFR ≥90.

Table 3: Distribution of patients according to their Blood Urea, Serum Creatinine, Serum Sodium (Na+), Serum Potassium (K+), Calcium (Ca+) Level.

Blood Urea (mg %)		Stage of Renal Disease			Total	
		Early	Late	Terminal	Frequency	Percentage (%)
<70		0	07	0	07	14
70-100		0	04	06	10	20
101-130		0	05	05	10	20
131-160		01	01	04	06	12
≥161		01	01	15	17	34
S. Creatinine (mg %)						
Male	≤1.2	0	0	0	0	0
	>1.2	0	08	16	24	48
Female	≤0.9	0	0	0	0	0
	>0.9	2	10	14	26	52
S. Sodium (mEq/L)						
<135		02	15	19	36	72
136-145		0	03	09	12	24
>146		0	0	02	02	04
S. Potassium (mEq/L)						
<3.6		0	06	05	11	22
3.6-5		01	07	11	19	38
>5.0		01	05	14	20	40
Calcium Level (mg %)						
<8.7		1	6	12	19	38
8.7-10.2		1	11	16	28	56
>10.2		0	01	02	03	6

Table 4: Distribution of patients according to their Glomerular Filtration Rate.

GFR (in ml/min)	Stage		Frequency		Percentage (%)	
≥90	1	Early	01	02	02	04
60-89	2		01		02	
30-59	3	Late	04	18	08	36
15-29	4		14		28	
<15	5	Terminal	30	30	60	60
Total			50	50	100	100

DISCUSSION

In present study it was found that 68% of the patients were in between 4th to 8th decade. Udani Amit et al. found that 62% of the patients were in between 4th to 8th decade.[6]

While analysing sex ratio of patients of CRF, in present study it was Male: Female- 1.00: 1.08. Udani Amit et al. Found that Male: Female- 1.77:1.00.[6]

40% (20) of patients had normal PP2BS, whereas 24% (12) patients had hyperglycemia & 36% (18) patients had impaired glucose tolerance.

Mean Blood urea level in CRF patients was as follows: In Present study it was 133.78 mg%, where as in study by 63% have their blood urea level in the range 101-250 mg/dl. Also one can see from the table that only 2% of patients have their blood urea level more than 300 mg/dl and hardly 1% had the value below 50 mg/dl[7]. In a study by Udani Amit et al.[8] it was 138.67 mg% .[6]

Mean serum creatinine level in CRF patients was as follows: In Present study it was 7.3 mg%, where as in Udani Amit et al.[6] it was 7 mg% & 7.226 mg% respectively. 60% of the patients have their Serum creatinine value in the range of 5-12 mg/dl. Only 2% of the patients have its value greater than 12.1 mg/dl, but 38% of the patients' exhibit that their serum creatinine value in the range 2-5 mg/dl.[7] 60% of the patients in present study were presented in late stage as their GFR was <15ml/min.

CONCLUSION

It is concluded from the study that there must be prescribed protocol for all CRF patients for estimating biochemical profile so that any complication can be identified at earliest & intervened to prevent morbidity & mortality.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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