ORIGINAL RESEARCH PAPER

General Medicine

KEY WORDS:

STUDY OF SERUM URIC ACID LEVEL AS A PROGNOSTIC FACTOR IN CHRONIC KIDNEY DISEASE-A HOSPITAL BASED STUDY

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INTRODUCTION-

Chronic kidney disease is defined by the presence of kidney damage or decrease kidney function for three or more months irrespective of the cause.The symptoms of worsening kidney function are non-specific, and might include feeling generally unwell and experiencing a reduced appetite . Often, chronic kidney disease is diagnosed as result of screening of people known to be at risk of kidney problems, such as those with high blood pressure or diabetes and those with a blood relative with chronic kidney disease.

Chronic kidney disease may also be identified when it leads to one of its recognized complications, such as cardiovascular disease, anemia or pericarditis[1]. Chronic kidney disease prevalence is increasing world-wide and prevalence of End stage renal disease (ESRD) is expected to rise by 52% from 2002 to 2020.[2]

Now CKD becoming a global health care burden so identif ication of modifiable risk factors, such as hyperglycemia, hypertension , hyperuricemia and implantation efforts to control these factors are imperative for CKD prevention. An elevated uric acid level is commonly observed in CKD patients. Hyperuricemia cause kidney injury including afferent arteriolopathy, glomerulosclerosis and tubuloin terstitial fibrosis.

MATERIAL AND METHODS-

This is a cross-sectional, prospective, randomized study was carried out in the Department of General Medicine, Jhalawar Medical College and SRG Hospital, Jhalawar. The study was comprised of 150 patients of either sex and age 18 years or above CKD patients attending medical indoor or Intensive care unit and dialysis unit for treatment. After selection of patients, General information and relevant history were asked by questionnaire methodology and clinical examination, renal function test, serum uric acid , lipid profile, CRP(qualitative), complete hemogram, liver function test, serum electrolytes, blood sugar and ultrasonography of abdomen and pelvis was done to check the size, shape and echo texture of kidney. GFR calculated by MODIFICATION OF DIET IN RENAL DISEASE (MDRD) study. In this study all the patients of either sex>18 years of age were included and those were less then 18 years of age, infected with HIV, had history of gout and hyperuricemia due to other cause and taking antitubercular or thiazide drugs were excluded from this study. After explaining details and moto of this study, informed consent was taken.

DIAGNOSTIC CRITERIA-

All the patients were evaluate for chronic kidney disease as per Kidney Disease Improving Global Outcome (KDIGO) classification of chronic kidney disease.

STATISTICAL ANALYSIS-

Data were analysed by using SPSS 20.0 (trial version) software and other appropriate statistical test were used to analyse the data.

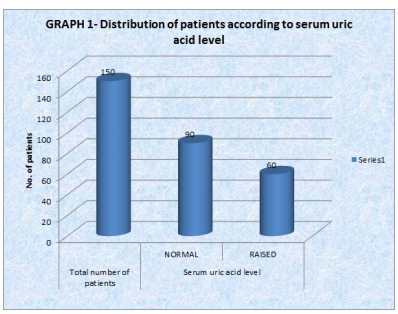
RESULTS-

150 patients of documented CKD were taken in which 65.33% were male and 34.66% were female. The mean age of study population was 56.48 years and maximum number of patients 81 (54%) belongs to age group 56-70 years followed by 41-50 years of age group (TABLE-1).

Table -1 Distribution of Patients according to age group

Age Group (Yr.)	No. of Pts.	Percentage (%)	Mean	S.D.
< 25	2	1.33	56.48	10.43
26-40	3	2		
41-55	60	40		
56-70	81	54		
>70	4	2.6		

The total study population were divided in to two groups according to serum uric acid level. Out of 150 CKD patients 90 were with normal serum uric acid level and 60 were raised serum uric acid level (GRAPH-1).

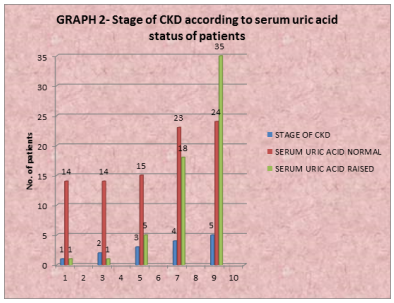


In this study we also noticed that stages of CKD also related to the severity of serum uric acid level. . There are 1.67% patients in stage 1 , 1.67% in stage 2 , 8.33% in stage 3, 30% in stage 4 and 58.33% in stage 5 with raised uric acid level as compared to 15.6% in stage 1 , 15.6% in stage 2, 16.7% in stage 3, 25.6% in stage 4 and 26.7% in stage 5 with normal uric acid level (TABLE-2, GRAPH-2).

Table-2 Stage of CKD according to serum uric acid status of patients

STAGE OF CKD	SERUM URIC ACID		p value
	NORMAL	**RAISED**	
1	14(15.6%)	1(1.67%)	<0.01
2	14(15.6%)	1(1.67%)	
3	15(16.7%)	5(8.33%)	
4	23(25.6%)	18(30%)	
5	24(26.7%)	35(58.33%)	
TOTAL	**90(100%)**	**60(100%)**	

This table depicts there is statistically significant (p<0.01) correlation of raised serum uric acid with increasing stage of CKD and its severity. there are 1.67% patients in stage 1 , 1.67% in stage 2 , 8.33% in stage 3, 30% in stage 4 and 58.33% in stage 5 with raised uric acid level as compared to 15.6% in stage 1, 15.6% in stage 2, 16.7% in stage 3, 25.6% in stage 4 and 26.7% in stage 5 with normal uric acid level.



Raised serum uric acid level is very important prognostic factor in CKD. In this study we observed that those patients having raised level of serum uric acid level associated with more fatal complications in comparison to normal uric acid level (TABLE-3).

Table-3 Complications in CKD patients and correlation with serum uric acid level

COMPLICATION	SERUM URIC ACID	
	NORMAL	**RAISED**
DIABETES MELLITUS	25(27.8%)	42(70%)
CARDIOVASCULAR DISEASE	21(38.9%)	36(60%)
SEVERE ANEMIA	22(31.88%)	40(78.43%)
DYSLIPIDEMIA	27(30%)	28(46.66%)
TUBERCULOSIS	1(1.11%)	4(6.6%)

DISCUSSION-

The CKD is an irreversible condition and patients who progress to chronic kidney failure have reduced quality of life and high mortality rates. As such , it is imperative to identify modifiable risk factors to develop strategies to slow CKD progression. Recently serum uric acid is proposed as a potential risk factor for new onset of kidney disease in the general population[3,4].

It is observed that incidence of CKD reaches its maximum strength in later part of life[8-10] because kidney filtration begins to fall by approximately 1% per year after age of 40. Punamyadav et al (2014)[5], George S. et al (2013)[6], Madero et al (2009)[7] also showed the same results in their study.

Hyperuricemia is one of key mechanism for the activation of rennin-angiotensin and cyclo-oxygenase-2 system in progressive renal disease which could be mediated by its effect to upregulate angiotensin-1 receptors on vascular smooth muscle cells and oxonic acid induced hyperuricemia induced systemic hypertension, glomerular hypertrophy, afferent arterioles sclerosis and macrophage infiltration in kidney.

Hyperuricemia induced arteriopathy of preglomerular vessels, which impairs the autoregulatory response of afferent arterioles resulting in glomerular hypertension and lumen obliteration induced by vascular wall thickening produced severe renal hypoperfusion. Hyperuricemia probably causes kidney damage by a mechanism involving systemic and glomerular hypertension. Tubulointerstitial fibrosis, which might be readily associated to the direct proinflammatory effects of soluble urate, is independent from the precipitation of monosodium urate crystals in the kidney.
In CKD patients, higher serum uric acid levels are associated with higher degree of renal dysfunction , hypertension, diabetes, dyslipidemia, smoking, CRP, urine albuminuria, anaemia, cardiovascular disease/ events and mortality. The most common cause of mortality in ckd patients with raised serum uric acid was cardiovascular disease/ events..

We found statistically significant ($p<0.01$) correlation of raised serum uric acid with increasing stages of CKD and its severity in comparison to other study. ANOVA study also showed the statistically significant positive correlation between raised serum uric acid and progressively declining renal functions and severity of CKD.

This could be attributed to the fact that recently, serum uric acid was proposed as a potential risk factor for new onset of kidney disease. From patho-physiological perspective, hyperuricemia result in progression of renal dysfunction through preglomerular arteriolopathy characterized by hyalinosis and wall thickening.

In our study it is found that, significant proportion of hyper te nsive and diabetic patients had come in CKD with raised serum uric acid group .This finding consistently matched with finding of studies by J.T.Park et al (2009)[11]

CONCLUSION-

From present study, we conclude that serum uric acid level is important risk factor in progression of chronic kidney disease. Complications like cardiovascular diseases, diabetes mellitus, dyslipidemia, anemia are more common in Chronic kidney disease patients with raised serum uric acid level . as our study suggests that most of the CKD patients attend hospitals in stage 5 with raised uric acid level . This highlights need of early investigation and treatment of high serum uric acid level so that complications do not occur.

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