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Original Research

Assessment of metabolic complications in patients with chronic kidney disease

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ABSTRACT:
Background: CKD metabolic complications, which include anemia, metabolic acidosis, and mineral and electrolyte disorders, may be asymptomatic for a long time. The present study conducted to determine metabolic complications of chronic kidney disease. **Materials & Methods:** 110 patients of chronic kidney disease of both genders were assessed for estimation of calcium, phosphate, bicarbonate, potassium, urea etc. **Results:** Out of 110 patients, 65 were male and 45 were females. Out of 110 patients, common clinical features werefatigue was seen in 54 patients, muscle pain in 48, bone pain in 22, vomiting in 17 and numbness in 32.Hyperkalemia was seen in 14, hypocalcemia in 20, hyperuricemia in 22, metabolic acidosis in 14, hyperphosphatemia in 7 patients. The difference was significant (P< 0.05). **Conclusion:** Metabolic complications such as common was hyperuricemia and hypocalcemia was common in CKD patients.
Key words: Chronic kidney disease,Hypocalcemia, hyperuricemia

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INTRODUCTION

Chronic kidney disease (CKD) is a precursor to end-stage kidney disease and is associated with an increased risk of death.[1]During the last decade the prevalence of chronic kidney disease (CKD) has increased considerably and is estimated to range from about 10-15% of the elderly population.[2]Early detection of CKD and its metabolic complications is now a priority for delaying disease progression and for primary prevention of many CKD-associated chronic diseases, including cardiovascular, mineral, and bone diseases; however, data on the natural history of these complications according to reference methods are sparse, and there is little evidence about the most appropriate timing for their detection.[3]

CKD metabolic complications, which include anemia, metabolic acidosis, and mineral and electrolyte disorders, may be asymptomatic for a long time.[4]During the last decade the prevalence of chronic kidney disease (CKD) has increased considerably and is estimated to range from about 10-15% of the elderly population.[5] Only portion of patients with early stage 3 CKD progresses to stage 4 where the risk of cardiovascular disease, end stage renal disease (ESRD), or death becomes substantially higher.It is unclear why future CKD progression is associated with early metabolic complications.[6] One explanation is that future progressors have an ongoing disease process, which results in greater parenchymal injury and metabolic complications, which is absent in non-progressors, and not yet reflected in the eGFR.[7] The present study conducted to determine metabolic complications of chronic kidney disease.

MATERIALS & METHODS

The present study comprised of110 patients of chronic kidney disease of both genders. All were informed regarding the study and written consent was obtained.
Data such as name, age, gender etc. was recorded. General physical examination was carried out in all. Clinical findings were recorded. 5 ml venous blood was obtained and was centrifuged at 3000 rpm for 10 minutes for the separation of serum and plasma respectively. The estimation of calcium, phosphate,

bicarbonate, potassium, urea etc. was performed. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 110		
Gender	**Male**	**Female**
Number	65	45

Table I shows that out of 110 patients, 65 were male and 45 were females.

Table II: Assessment ofclinical features in patients

Clinical features	Number	P value
Fatigue	54	0.17
Muscle pain	48	
Bone pain	22	
Vomiting	17	
Numbness	32	

Table II, graph II shows that out of 110 patients, common clinical features were fatigue was seen in 54 patients, muscle pain in 48, bone pain in 22, vomiting in 17 and numbness in 32. The difference was non- significant (P> 0.05).

Graph II: Assessment ofclinical features in patients

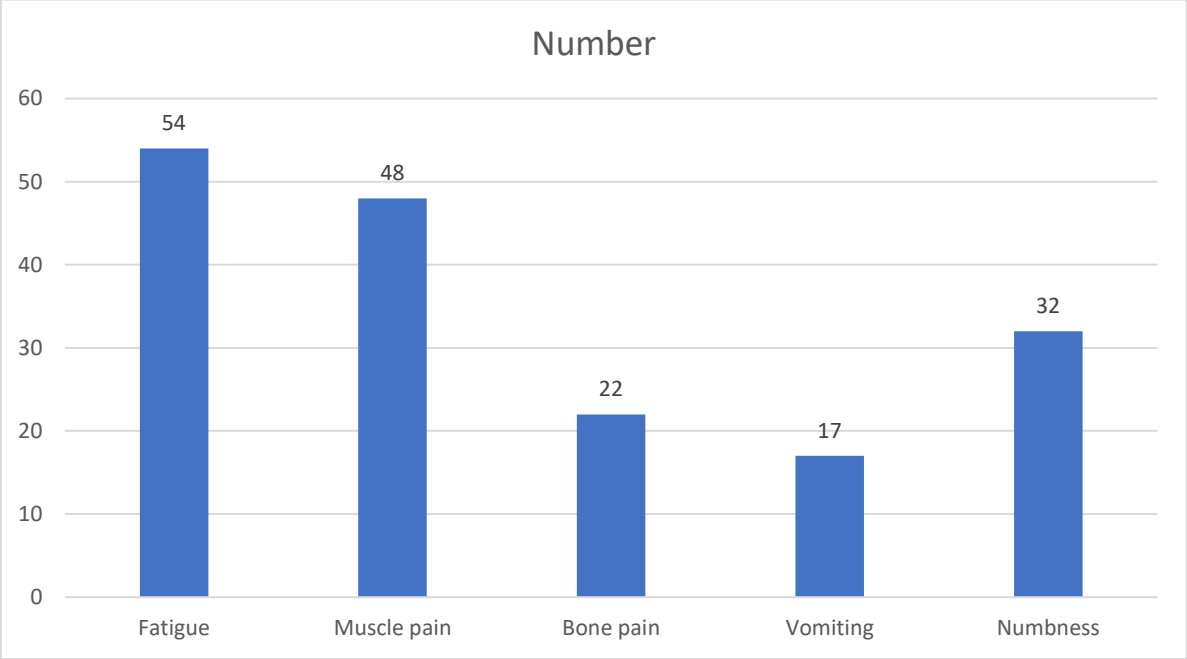
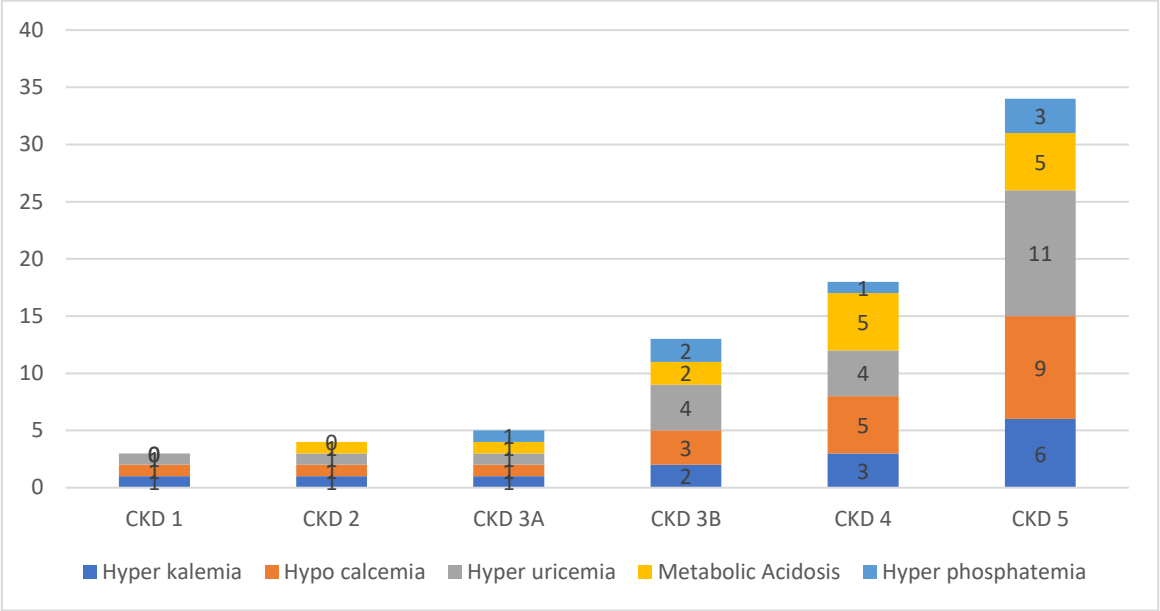


Table III: Assessment ofmetabolic complications

Stage	Hyper kalemia	Hypocalcemia	Hyper uricemia	Metabolic Acidosis	Hyper phosphatemia	P value
CKD 1	1	1	1	0	0	0.11
CKD 2	1	1	1	1	0	0.16
CKD 3A	1	1	1	1	1	0.41
CKD 3B	2	3	4	2	2	0.27
CKD 4	3	5	4	5	1	0.02
CKD 5	6	9	11	5	3	0.04
Total	14	20	22	14	7	

Table III, graph II shows that hyperkalemia was seen in 14, hypocalcemia in 20, hyperuricemia in 22, metabolic acidosis in 14, hyperphosphatemia in 7 patients. The difference was significant (P< 0.05).

Graph II: Assessment ofmetabolic complications



DISCUSSION

Prevalence of CKD worldwide is estimated to be 8-16% and in India prevalence is 17.2%.CKD is diagnosed on the basis of presence of markers of kidney damage and kidney function.[8]Only a portion of patients with early stage 3 CKD progress to stage 4 where the risk of cardiovascular disease, end stage renal disease (ESRD), or death becomes substantially higher.[9] Identifying the subset of patients who enter stage 3 and are most likely to progress to stage 4 CKD could both improve outcomes, by allowing more appropriate referrals for specialist care, as well as spare those unlikely to progress the adverse effects and costliness of an unnecessarily aggressive approach.[10]The present study assessed metabolic complications of chronic kidney disease.

In present study, out of110 patients, 65 were male and 45 were females.Moranne et al[11] included 1038 adult patients who had stages 2 through 5 CKD and were not on dialysis, to study the occurrence of metabolic complications. GFR was measured using renal clearance of ^{51}Cr-EDTA (mGFR) and estimated using two equations derived from the Modification of Diet in Renal Disease study. As mGFR decreased from 60 to 90 to <20 ml/min per 1.73 m^2, the prevalence of hyperparathyroidism increased from 17 to 85%, anemia from 8 to 41%, hyperphosphatemia from 1 to 30%, metabolic acidosis from 2 to 39%, and hyperkalemia from 2 to 42%. Factors most strongly associated with metabolic complications, independent of mGFR, were younger age for acidosis and hyperphosphatemia, presence of diabetes for acidosis, diabetic kidney disease for anemia, and both male gender and the use of inhibitors of the renin-angiotensin system for hyperkalemia. mGFR thresholds for detecting complications with 90% sensitivity were 50, 44, 40, 39, and 37 ml/min per 1.73 m^2 for hyperparathyroidism, anemia, acidosis, hyperkalemia, and hyperphosphatemia, respectively. Analysis using estimated GFR produced similar results. In summary, this study describes the onset of CKD-related complications at different levels of GFR; anemia and hyperparathyroidism occur earlier than acidosis, hyperkalemia, and hyperphosphatemia.

We found that out of 110 patients, common clinical features wasfatigue was seen in 54 patients, muscle pain in 48, bone pain in 22, vomiting in 17 and numbness in 32.Gjørup et al[12] found that of the total 229 study participants, 50.2% were females and the mean age was 47±15.7 years. Among study participants, the prevalence of chronic kidney disease (CKD) was found to be 21.8%. Of all study participants, 9 (3.9%) had renal impairment (eGFR < 60 ml/min/ 1.73 m^2) and 46 (20.1%) had albuminuria. Older age, systolic blood pressure ≥140mmHg, type 2 diabetes mellitus and longer duration of diabetes were independent risk factors of CKD.

NHANES III found that metabolic acidosis increased significantly at a GFR <30 ml/min per 1.73 m2. A younger age was independently associated with acidosis. This may be explained, as for hyperphosphatemia, by higher protein intake among younger patients.[13]

CONCLUSION

Authors found that metabolic complications such as common was hyperuricemia and hypocalcemia was common in CKD patients.

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