

To Correlate Calcium and Phosphorus Metabolism in Different Stages of Ckd with and Without Hemodialysis – A Study from Central India

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Abstract

In many countries, nephrologists follow clinical practice guidelines for mineral bone disorders to control abnormal serum calcium (Ca) and phosphorus (P) levels in patients WITH AND WITHOUT maintenance hemodialysis (MHD). We aimed to evaluate serum mineral levels in CKD patients to determine their relationship with CLINICAL SYMPTOMS. These results may provide insight into the status of current practice in the era of such guidelines.

Introduction

Interminable kidney ailment (CKD) is a sort of kidney ailment where there is progressive loss of kidney work over a time of months to years. Initially there are commonly no side effects; later, indications may incorporate leg growing, feeling tired, spewing, loss of craving, and confusion.[2] Complications incorporate an expanded danger of coronary illness, hypertension, bone malady, and anemia.

Reasons for constant kidney infection incorporate diabetes, hypertension, glomerulonephritis, and polycystic kidney disease. Risk factors incorporate a family ancestry of interminable kidney disease. Diagnosis is by blood tests to gauge the evaluated glomerular filtration rate (eGFR), and a pee test to quantify albumin. Ultrasound or kidney biopsy might be performed to decide the hidden cause. Several seriousness based organizing frameworks are in use.

Screening in danger individuals is recommended. Initial medicines may incorporate meds to bring down circulatory strain, glucose, and cholesterol. Angiotensin changing over chemical inhibitors (ACEIs) or angiotensin II receptor rivals (ARBs) are commonly first-line specialists for pulse control, as they moderate movement of the kidney sickness and the danger of heart disease. Loop diuretics might be utilized to control edema and, if necessary, to additionally bring down blood pressure. NSAIDs ought to be avoided. Other suggested measures incorporate remaining dynamic, and certain dietary changes, for example, a low-salt eating routine and the perfect measure of protein. Treatments for paleness and bone infection may likewise be required. Severe ailment requires hemodialysis, peritoneal dialysis, or a kidney transplant for survival.

Constant kidney malady influenced 753 million individuals internationally in 2016: 417 million females and 336 million males. In 2015 it caused 1.2 million passages, up from 409,000 in 1990. The causes that add to the best number of passages are hypertension at 550,000, trailed by diabetes at 418,000, and glomerulonephritis at 238,000.

Signs and indications

CKD is at first without indications, and is normally recognized on routine screening blood work by either an expansion in serum creatinine, or protein in the pee. As the kidney work diminishes:

Circulatory strain is expanded because of liquid over-burden and creation of vasoactive hormones made by the kidney by means of the renin-angiotensin framework, expanding the danger of creating hypertension and cardiovascular breakdown.

Urea collects, prompting azotemia and eventually uremia (manifestations running from dormancy to pericarditis and encephalopathy). Because of its high foundational fixation, urea is discharged in eccrine perspiration at high focuses and takes shape on skin as the perspiration dissipates ("uremic ice").

Potassium collects in the blood (hyperkalemia with a scope of indications including discomfort and possibly deadly heart arrhythmias). Hyperkalemia as a rule doesn't create until the glomerular filtration rate tumbles to under 20–25 ml/min/1.73 m², so, all in all the kidneys have diminished capacity to discharge potassium. Hyperkalemia in CKD can be exacerbated by acidemia (which prompts extracellular move of potassium) and from absence of insulin.

Liquid over-burden manifestations may extend from mellow edema to dangerous aspiratory edema.

Hyperphosphatemia results from helpless phosphate end in the kidney. Hyperphosphatemia adds to expanded cardiovascular hazard by causing vascular calcification. Circulating convergences of fibroblast development factor-23 (FGF-23) increment logically as the kidney limit with regards to phosphate discharge decreases which may add to left ventricular hypertrophy and expanded mortality in individuals with CKD.

Hypocalcemia results from 1, 25 dihydroxyvitamin D3 inadequacy (brought about by high FGF-23 and diminished kidney mass) and protection from the activity of parathyroid hormone.[25] Osteocytes are liable for the expanded creation of FGF-23, which is an intense inhibitor of the protein 1-alpha-hydroxylase (answerable for the change of 25-hydroxycholecalciferol into 1,25 dihydroxyvitamin D3). Later, this advances to auxiliary hyperparathyroidism, kidney osteodystrophy, and vascular calcification that further disables heart work. An outrageous result is the event of the uncommon condition named calciphylaxis.

Changes in mineral and bone digestion that may cause 1) anomalies of calcium, phosphorus (phosphate), parathyroid hormone, or nutrient D digestion; 2) variations from the norm in bone turnover, mineralization, volume, straight development, or quality (kidney osteodystrophy); and 3) vascular or other delicate tissue calcification. CKD-mineral and bone issue have been related with poor outcomes.

Metabolic acidosis may result from diminished ability to create enough alkali from the cells of the proximal tubule. Acidemia influences the capacity of compounds and builds sensitivity of cardiovascular and neuronal films by the advancement of hyperkalemia.

Iron deficiency is normal and is particularly predominant in those requiring haemodialysis. It is multifactorial in cause, yet incorporates expanded irritation, decrease in erythropoietin, and hyperuricemia prompting bone marrow concealment.

In later stages, cachexia may create, prompting accidental weight reduction, muscle squandering, shortcoming and anorexia.

Sexual brokenness is exceptionally regular in the two people with CKD. A dominant part of men have a diminished sex drive, trouble acquiring an erection, and arriving at climax, and the issues deteriorate with age. A lion's share of ladies experience difficulty with sexual excitement, and agonizing feminine cycle and issues with performing and appreciating sex are common.

Individuals with CKD are more probable than everyone to create atherosclerosis with ensuing cardiovascular sickness, an impact that might be at any rate incompletely interceded by uremic toxins. [unreliable clinical source?] People with both CKD and cardiovascular ailment have essentially more awful forecasts than those with just cardiovascular disease.

Methods

Material and Method

Between September 2019 to march 2020, clinical data of 55 patients were collected from patients with ckd with and without undergoing MHD admitted in Dept of Nephrology and organ transplantation, Sharda superspecialty hospital. All patients were subjected to Renal Function Tests, serum electrolytes including Calcium and phosphorus and all other relevant routine investigations.

Result

A total of 55 patients were studied of which 70.38% were males and 29.62% females.

The mean age of the patients was 51.75 ± 13.52 years.

Mean serum Calcium level was 8.282 ± 1.60 while mean serum Phosphorus was 5.79 ± 5.34 .

42.59% of the studied patients were having ckd due to diabetic kidney disease.

Mean Calcium Phosphorus product was 65.71 ± 7.07 and it was ≥ 55 in 21.8% cases

Among patients with Calcium Phosphorus product ≥ 55 , 45.45% of patient had cardiac abnormality.

Stage wise distribution of patients in stage I, II, IIIa, IIIb, IV, and V was nil, 3.6%, 3.6%, 1.8%, 9.09% & 81.1% respectively

Calcium imbalance were seen from stage 2 of ckd, serum phosphorus imbalance observed from stage 3b of ckd and ca^*po_4 product more than 55 from stage 4 in our study.

Itching were seen in 44%, redness 18.1% and ulcer over hand and legs in 9.09% of the patient in our study.

Discussions

Male had more Calcium phosphorus product more than 55 as compared to

females.

21.8% patients had Calcium phosphorus product more than 55.

More cardiac abnormality like LVH and valvular lesions seen in patient with raised ca^*po_4 product.

Conclusions

Itching and other skin manifestations were much more common in patients with Calcium phosphorus product more than 55.

With increasing stage of ckd the serum calcium, serum phosphorus and ca^*po_4 product imbalance also get worsen.

Biography

Professor Dr. Punit Gupta is MBBS, MD (Medicine), DM (Nephrology) and PhD. He is the Honorary Nephrologist to the Governor of Chhattisgarh State since 2009. He is Chairman and Members of many important academic and management committees of various Government Medical Institutions in the country and the Pt. Deen Dayal Upadhyay Health Sciences University, Raipur. He has guided over 100 Postgraduate & Technologist student for their thesis & Project in Nephrology & Research and also served as an examiner for the university examinations. A man of researches and publication, he has presented more than 160 research papers and abstracts on Kidney Diseases in Tribal populations at Renowned National and International Conferences. He was felicitated for being the only research scholar who had presented 29 abstracts in Indian Society of Nephrology conference, Pune and 11 research papers at Asia Pacific congress of Nephrology, 2008 in Malaysia on tribal kidney diseases. His Oral Paper was awarded first prize in ISNCON 2007, New Delhi. He was awarded internationally prestigious APCN Developmental awards in Malaysia 2008 and a Follow Scholarship by International Society of Peritoneal Dialysis in Turkey 2008. His paper was recognized as a best Paper in API 2014, Bhillai. He was awarded Certificate of Excellence awards by the Times of India groups 2016. His work was appreciated with certificate of appreciation by Indian Dietician association 2016. He was felicitated by Agrasen Agrawal Samaj for his excellent work in Tribal Population 2016. He was honoured with excellence award by 'Z' TV Chhattisgarh for this distinguishes work in kidney disease in rural population of Chhattisgarh in 2017. He has developed a concept of Teledialysis, first of its kind in Asia. He has developed Portable dialysis Machine (MAKE-D) for 60 billion kidney patients in world who require dialysis many times in a week. He has developed an abdominal Pressure Measurement Scale, which is very useful of Continuous Ambulatory Peritoneal Dialysis Patients (type of dialysis). He has developed and economic, efficient and effective walkie talkie system for consultation and directions to the hospital staff and doctors. He has been awarded Dr. B. C. Roy National Award for his research to give Aid or Assistance to Research Project for the year 2016.