



CLINICAL PROFILE OF END STAGE RENAL DISEASE IN PATIENTS UNDERGOING HEMODIALYSIS

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ABSTRACT

The aim of this paper is to study clinical profile of patients with end stage renal disease (ESRD) undergoing hemodialysis. The objective of our study was to study the clinical profile and laboratory parameters of end stage renal disease. In this paper, the main focus is on finding out possible etiology which may lead to end stage renal disease.

Introduction: Chronic kidney disease (CKD) has emerged as a major public health problem world over. The incidence of ESRD in India is approximately 150–200 pmp yearly. DM and hypertension are important causes of CKD. (1)

Criteria for CKD (either of the following present for >3 months) is as follows: Markers of kidney damage (one or more) - Albuminuria (AER >or equal to 30 mg/24 hours; ACR >or equal to 30 mg/g >or equal to 3 mg/mmol); Urine sediment abnormalities; Electrolyte and other abnormalities due to tubular disorders; Abnormalities detected by histology; Structural abnormalities detected by imaging. (2)

Materials and Methods: This prospective observational study was conducted in Department of Nephrology, D.Y Patil Hospital, Nerul, Navi Mumbai. The study was started after the approval of Institutional Ethics Committee. A written signed informed consent was sought. A total of 140 patients presenting with symptoms of ESRD on maintenance hemodialysis thrice a week and with stable A-V fistula as vascular access were enrolled. Prescription of hemodialysis was optimized.

KEYWORDS : End stage renal disease /Maintenance hemodialysis/Anemia/Malnutrition

Review of Literature:

The most common causes of kidney disease in India in both men and women are Diabetes and Hypertension. However, there are certain conditions are greater in incidence among women - for example, urinary tract infections that lead to infection and scarring of the kidneys and autoimmune diseases, Rheumatoid Arthritis, SLE.

Nutrition:

Low levels of serum albumin are highly predictive of poor clinical outcomes in all stages of CKD, and therefore, serum albumin is considered a reliable marker of general clinical health status. The urea reduction ratio and serum albumin concentration as predictors of mortality in patients undergo hemodialysis. (3)

Clinical guidelines recommend maintenance of a value of 4.0 g/dL or greater for serum albumin in stage 5 CKD patients. Serum prealbumin is a sensitive marker for assessing subtle changes in visceral protein stores given its low body pool and fairly rapid turnover of 2–3 days. Levels less than 30 mg/dL suggest protein depletion. (4)

Low serum creatinine concentrations are associated with poor clinical outcome in maintenance of stage 5 CKD. Patients with serum creatinine concentration less than 10 mg/dL should be evaluated for muscle wasting due to poor nutrition.

Utilization of Subjective Global Assessment (SGA) as a nutritional assessment tool for various stages of CKD is growing in both clinical and research settings. Prevention and treatment are as important as identifying inadequate nutritional status in CKD patients. Therapy varies with the severity of CKD. In cases in which low protein and energy intake (as noted in patients on unrestricted diets), a dietary protein intake of less than .75 g/kg/d is an early warning sign for the development of uremic malnutrition.

Fluid and Electrolyte Imbalance in ESRD Potassium:

Renal insufficiency acute or chronic: reduced GFR (especially <15 ml/min/1.73 m²) with low urine flow (and therefore low sodium delivery to the distal tubule) lead to decreased renal excretion of potassium. (5) Plasma potassium concentration depends on factors such as diuretic use. Acute changes present the greatest threats to life by causing arrhythmia. A range of drugs may cause acute hyperkalemia such as - blockers, potassium-sparing diuretics (e.g. spironolactone), ACE inhibitors, angiotensin antagonists, NSAIDs and nephrotoxins such as aminoglycosides cyclosporins and few other drugs. Extracellular acidosis causes an exchange of intracellular potassium for extracellular hydrogen ions in an attempt to maintain electrical neutrality. In acute metabolic acidosis, the serum potassium will rise 0.5 mmol litre⁻¹ for each 0.1 unit decrease in pH.

Anemia:

The NKF defines anemia as haemoglobin of less than 13.5g/dLin men and less than12.0 g/dL in women. A normochromic, normocytic anemia usually accompanies progressive kidney disease and the prevalence of CKD-associated anemia is approximately 50%. (6)

The presence LVH is associated with decreased survival of patients of ESRD on dialysis. Anemia is an independent predictor of death in a patient of stable coronary artery disease with CKD.

Concentration of sodium:

In an individual with normal renal function, more than 25,000 mmol of sodium ions are filtered daily with less than 1% being excreted. CRF can be associated with hypernatremia, hyponatremia or normal sodium balance and is influenced by factors such as diuretic use and cardiac function. However, in most of the patients demonstrate a mild degree of sodium and

water retention whilst the extracellular fluid volume remains isotonic. Ironically, the patient with CRF also has impaired renal concentrating mechanisms and thus extra renal fluid losses such as vomiting, diarrhea or pyrexia may rapidly cause hypovolemia.⁽⁷⁾

RESULTS:

In our study of ESRD patients out of 140 patients 68(48.6%) were male and 72(51.4%) were females. Maximum patient were between 41 to 50 years of age 52 (37%). 64 (45.7%) were underweight i.e. BMI below 18.5 and 76 (54.3%) were with normal BMI. Hb <6 found in 4 (2.9%), Hb between 6to8 in 60 (42.9%), Hb between 8to 10in 68(48.6), Hb more than 10 in 8(5.7%) patients. in our study 28.6%of patients were having hyperkalemia. calcium level found < 8.5 in 84(60%),8.5 to 10.5 in 44 (31.4%),more than 10.5 in 12 (8.6%)patients. Patients with calcium less than 8.5 were clinically asymptomatic, sodium level Less than 135meq/l in 36 (25.7%), 135 to 155 meq/l in 104 (74.3%).

Table no 1: serum sodium (Na) and potassium (K) level

Serum level Na /k	No. of patients/percentage (n= 140)
Na <135meq	36 (25.7%)
Na 135-145meq	104(74.3%)
K <3.5 meq	16(11.4%)
K 3.5-5.5	84(60%)
K>5.5	40(28%)

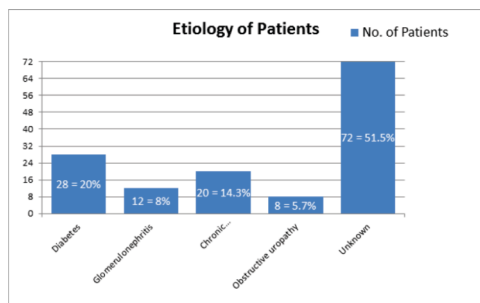
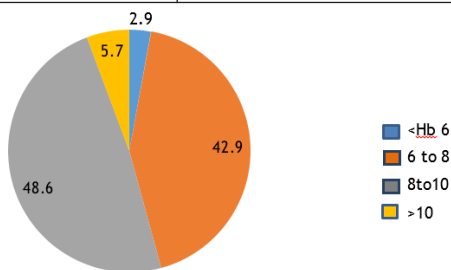


Figure no. 1 Representing etiology of patients

Table no. 2: Serum phosphorus level PO4 and serum calcium level

serumPO4/Ca level	No. of Patients/percentage (n=140)
Po4 <2.5	12(8.6%)
Po4 2.5-4.5	36(25.7%)
Po4 >4.5	92(65.7%)
Ca <8.5	84(60%)
Ca 8.5 to 10.5	44(31.4%)
Ca > 10.5	12(8.6%)



Percentage of hemoglobin (Hb) in ESRD patients
Figure2 Representing Percentage of hemoglobin(Hb) in ESRD patients

DISCUSSION:

There is a rising incidence of chronic kidney disease that is likely to pose major problems for both healthcare and the economy in future years. In India, it has been recently

estimated that the age-adjusted incidence rate of ESRD to be 229 per million population (pmp), and >100,000 new patients enter renal replacement programs annually. The lack of community based screening programs has led to patients being detected with CKD at an advanced stage. It is possible that early detection of kidney disease through community based screening programs might have an impact on this problem through earlier intervention. The Screening and Early Evaluation of Kidney Disease Project (SEEK) was designed and performed to generate data to determine the prevalence and risk factors for CKD in India.⁽⁸⁾

As patients progress through the stages of CKD, nutritional requirements are altered and metabolism is affected. In more extreme manifestations, these alterations in nutrient utilization cause "uremic malnutrition," a syndrome that is distinct from malnutrition caused by inadequate nutrient intake.

Vijaya KL⁽⁹⁾,ArunaM,etal.foundthatseveral smallandlarge-scalecohortstudies have revealed that protein-energy malnutrition (PEM) was associated with increased morbidity, mortality, and impaired quality of life. Protein-energy wasting (PEW) in these patients may be a consequence of both a decreased dietary intake and increased nutrient losses. Reports have suggested a strong association between nutrition and clinical outcome in hemodialysis patients. In majority of patients, cause of ESRD was not known .It is difficult to decide the etiology in few patients as patients already presented with ESRD.

In our study Serum potassium level in our study out Of 140 patients k less than 3.5 found in 16 (11.4%), 3.5 to 5.5 in 84 (60%), more than 5.5 in 40 (28.6%). In our study 28% of patients were having hyperkalemia.

In our study out of 140 patients sodium level Less than135meq/l in 36(25.7%),135 to 155 meq/l in 104 (74.3%). Schrier RW, Sharma S et al. hyponatremia is the most common electrolyte disorder, estimated to be present in 4%–8% of ambulatory patients and 20%–35% of hospitalized patients which is matching with our study. It also is associated with increased morbidity and mortality. It is unclear whether hyponatremia is itself a marker of severe disease or normalization of serum sodium levels could improve patient outcomes. Hypernatremia is much less common than hyponatremia, with an estimated prevalence of 2% among patients admitted to the hospital.⁽¹⁰⁾Theoretically, as diluting and concentrating mechanisms become increasingly impaired with progressive disease, the prevalence and incidence of dysnatremia is in patients with CKD are expected to be greater than in populations with normal kidney function.

The prevalence of hypernatremia, but not hyponatremia, increased in patients with more progressive kidney disease. Treatment of hyponatremia in patients with ESRD primarily relies on 2 modalities: restriction of fluid intake and renal replacement therapy prescription.

In our study out of 140patients, calcium level found <8.5 in 84(60%), 8.5 to 10.5 in 44 (31.4%), more than 10.5 in 12 (8.6%) hypocalcemia is known entity in CKD patients, in our study it 60% patients were with hypocalcemia. Patients with calcium level less than 8.5 were asymptomatic

In our study Hb<6 found in 4(2.9%), Hb between 6 to 8 in 60(42.9%),Hb between 8to 10in 68(48.6%), Hb more than 10 in 8(5.7%) patients. Mehul Kaliya, Mittal rathod, Aniruddha Gohel, Ajay Tanna, Manish Mehta et al published in international journal of applied research on Anemia in Chronic Kidney Disease (Ckd) Patients, found that anemia is common in developing country and CKD is affecting

haemopoietic system.

In our study out 140 patients of serum phosphorus level is <2.5 in 12 (8.6%), 2.5 to 4.5 in (25.7%), More than 4.5 in 92 (65.7%) patients. Sanjay Vikrant, Anupam Parashar et al.

showed that SHPT (secondary hyper parathyroidism), hyperphosphatemia, hypocalcemia, increased alkaline phosphatase, and Vitamin D deficiency were quite common in Indian CKD subjects. A total of 462 patients of CKD Stage 3–5D were studied. The frequency of various biochemical abnormalities was hypocalcemia (23.8%), hypercalcemia (5.4%), hypophosphatemia (2.8%), hyperphosphatemia (55.4%), raised alkaline phosphatase (56.9%), secondary hyperparathyroidism (82.7%), and hypoparathyroidism (1.5%).⁽¹¹⁾ Most common electrolyte abnormality found was hyponatremia in 25.7% of patients, hyperkalemia in 28.6% of patients, hypocalcemia in 60% of patients, hyperphosphatemia 65.7% and hyperurecemia in 20%.

CONCLUSION:

Anemia is very common in patients on maintenance hemodialysis. Most common electrolyte abnormality found was hyponatremia, hyperkalemia, hypocalcemia, hyperphosphatemia. In majority of patients' cause of ESRD was unknown.

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