

Clinical presentation in patients with chronic kidney disease in emergency department in tertiary care hospital

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Abstract

Introduction: Chronic kidney disease is characterized by the presence of an abnormality of kidney structure or function (or both) present for at least 3 months. The time between initial onset of disease and development of terminal renal failure may vary considerably not only between different diseases but also in different patients with similar disease processes. Only 3% to 5% of all patients with ESRD in India get some form of renal replacement therapy. Thus, planning for prevention of CKD on a long-term basis is the only practical solution for India.

Methodology: Patients with chronic kidney disease presented and admitted at Emergency Medicine department of New civil hospital, Surat over the period of six months after getting permission from ethical committee. All patients came in emergency department with chronic kidney disease are included in the study

after full filling my inclusion criteria. Analysis of 60 patients was done during this period.

Result: Majority of the age group was in the range of 41-60 years about 50 % due to several risk factors varies with age such Diabetes, Hypertension. Symptoms of volume overload like Dyspnea, Puffiness of face, abdominal distension was found most common in CKD patients in range from 76.66-71.66% followed by oliguria (70%), GIT symptoms (66.66%) such as nausea, vomiting, decrease appetite, Neuromuscular symptoms (50%) like muscle cramps, paresthesia. Symptoms of Lower urinary tract like dysuria, poor urinary stream, hesitancy and pruritus were found least common (2%) in study population. Most commonly CKD patients were pallor (90%), had pedal odema (73.33%) and Elevated Blood pressure (BP \geq 140/90).

Conclusion: Male comprises about more about than female in our study population as risk factors of CKD such as hypertension and smoking are commoner in males than females. Symptoms of volume overload like

Dyspnea, Puffiness of face, abdominal distension, oliguria, GIT symptoms, Neuromuscular symptoms found in CKD. Most commonly CKD patients were pallor, pedal edema and Elevated Blood pressure. Electrolyte abnormalities commonly noted was Hyperkalemia and Hyper phosphate Mia. Anemia and Hyperkalemia were the most common complication found in CKD patients in our study population.

Keywords: Chronic kidney disease, Serum potassium.

Introduction

Chronic kidney disease is characterized by the presence of an abnormality of kidney structure or function (or both) present for at least 3 months (1)(2). The clinical course is typically one of a progressive and unrelenting loss of nephron function ultimately leading to end stage renal disease. Kidney failure is the most visible aspect of the spectrum, but it represents only a minority of the total population affected by kidney disease. CKD is more prevalent in the elderly population. However, while younger patients with CKD typically experience progressive loss of kidney function, 30% of patients over 65 years of age with CKD have stable disease (3).

The time between initial onset of disease and development of terminal renal failure may vary considerably not only between different diseases but also in different patients with similar disease processes. The progressive nature of CKD and the ensuing ESRD is putting a substantial burden on global health resources since all modalities of treatment are expensive.

There are multiple causes of kidney injury that lead to the final common pathway of ESRD, and this syndrome is characterized by hyper tension, anemia, renal bone disease, nutritional impairment, neuropathy, impaired quality of life, and reduced life expectancy. Increasing evidence acquired in the past decades indicates that the

adverse outcomes of CKD such as renal failure, cardiovascular disease, and premature death can be prevented or delayed by early detection of CKD. Earlier stages of CKD can be detected through laboratory testing only. Treatment of earlier stages of chronic kidney disease, as well as initiation of treatment of cardiovascular risk factors at early stages of CKD should be effective in reducing the rate of progression of CKD to ESRD.

Unfortunately, despite the evident importance of CKD there is limited data on its epidemiology within the general population, especially from developing countries like India. Two community-based studies have shown a prevalence of chronic renal failure of 0.16% (3) and 0.79% (1). Renal failure registry data is unlikely to be representative of the broader spectrum of CKD. There is a wide variability both within and between countries in the occurrence, clinical characteristics and outcomes of patients with kidney failure and there have been substantial changes over time. Only 3% to 5% of all patients with ESRD in India get some form of renal replacement therapy (3). Thus, planning for prevention of CKD on a long-term basis is the only practical solution for India.

This study was taken up to highlight the clinical presentation, complications and outcome of patients who presented with CKD in Emergency department in a tertiary care hospital.

Material and method

Study design: Cross sectional study

Study setting: Department of General Medicine, Tertiary care hospital, Surat.

Study Participants: All patients of ckd who were attending the Tertiary care hospital, Surat to avail the health services.

Inclusion criteria: All adult patients (≥ 18 years) with diagnosed case of chronic kidney disease whose estimated creatinine clearance < 60 ML./min are included in the study.

$$\text{CrCl (mL/min)} = \frac{(140 - \text{age}) \times \text{Lean Body Weight (kg)}}{\text{Serum Creatinine (mg/dL)} \times 72} \quad (\times 0.85 \text{ if female})$$

Where CrCL = creatinine clearance

Exclusion criteria

- Incomplete medical records.
- Age < 18 years
- Those patients who does not give consent to be part of the study.
- The patient who are on maintaince hemodialysis are excluded from this study.

Sample size calculation

All patients determined to have ckd during the information assortment period were remembered for this review following incorporation and rejection rules.

Sample size: 60

Procedure

A Cross sectional study of patients with chronic kidney disease presenting in emergency department will be conducted as follows

After admission and initial resuscitation at emergency department / in respective ward, patients who will fulfil above inclusion criteria will be prospectively studied by

- Direct interview with patient or patient’s relatives accompanying the patient and obtaining a detailed history.
- Clinical examination including examination of vitals, general and systemic examination. E.g., Raised BP, Breathlessness, Pallor, Decreased urine output.

- Laboratory investigation includes: Complete blood count, Serum urea, Serum creatinine.
- Analysis of results based on Clinical features, Laboratory investigations, ECG findings, Complications.

Result and discussion

Table 1: Sex Distribution of the patients

Sex	No. of Patients	Percentage
Male	38	63.33
Female	22	36.66
Total Patients	60	100

Among the 60 patients included in the study, 38 (63.33%) were males and 22 (36.66%) were females. Male comprises about more about 63.33% than female in our study population which is in accordance with Sylvanus et al.(4) in which 75.3% male predominance was observed. In System Yang et al. studies of CKD patients show a substantially higher prevalence of CKD and incidence rate of ESRD in male than those observed in female patients. The male predominance might be a reflection of the fact that CKD and its risk factors such as hypertension and smoking are commoner in males than females (5). This is also probably explained by social, cultural, and environmental differences, such as genetic predisposition, self-care, and hormonal factors.

Table 2: Age Distribution of Patients

Age Group (Years)	Total	Percentage
21-40	20	33.33
41-60	30	50
>60	10	16.666
Total	60	100

Among 60 patients in our study, majority of patients (50%) were in the age range of 41-60 years. Since risk factors for chronic kidney diseases varies with age. Similar age distribution of CKD patients were found in

studies of 70 patients of CKD by Amin et al. In dialysis centers of Pakistan Institute of Medical Science Islamabad and Bilal Hospital Rawalpindi. Several factors may account for age distribution patients such as Hypertension, diabetes and diabetes mellitus may contribute to development of CKD.

Table 3: clinical symptoms

Presenting symptoms	Number of patients (60)	Percentage
Dyspnea	46	76.66
Facial Fluffiness	43	71.66
Oliguria	32	53.33
GI Symptoms	40	66.66
Neuromuscular Symptoms	30	50
Lower urinary tract symptoms	2	3.33
pruritus	2	3.33

Of the 60 patients, 46 (76.66%) had dyspnea, which also was found common symptom in accordance to Sylvanus et al. (6). The symptoms of volume overload like Dyspnea, Puffiness of face, abdominal distension was found most common in range of 76.66 -71.66% followed by Oliguria (70%) followed by GIT symptoms (66.66%) like Nausea, Vomiting, Decreased appetite followed by Neuromuscular symptoms (50%) like Headache, Muscle cramps, paresthesia. Symptoms of Lower urinary tract like Dysuria, poor urinary stream, hesitancy and Pruritus were found least about 2% among the study population.

The pathophysiologic mechanisms and the most important putative etiologies underlying dyspnea in CKD patients is Anemia, Congestive heart failure, pulmonary hypertension, sodium, and fluid overload are potential frequent causes of breathing disorders in CKD patient. Oliguria in my study was defined as a urine

output that is less than than 400 ml/day as accordance to Sylvanus et al. (6). Oliguria is often the earliest sign of impaired renal function. Symptoms of volume overload like Dyspnea, Puffiness of face, abdominal distension occurs due to water retention due to a loss of GFR leading to sodium and fluid retention. Fluid moves into the extravascular space, due to increased hydrostatic pressure, causing pitting edema in the lower extremity. Nausea and vomiting, muscle cramps, pruritis in CKD occurs mostly as a result of uremia.

Table 4: presenting sings

Signs	Number of patients	Percentage
Pallor	54	90
Raised Blood pressure	45	75
Altered sensorium	5	8.33
Pedal Odema	44	73.33
Ascites	12	20
Pulmonary Odema	22	36.66
Pleural effusion	3	5
Pericardial rub	2	3.33

Out of 60 patients of CKD in our study, 54 (90%) was pallor, 44 (73.33%) had pedal odema, 45 (75%) patients had Raised Blood pressure (BP \geq 140/90), 22 (36.66%) patients had pulmonary odema, 12 (20%) patients presented with ascitis, 5 (8.33%) patients were presented with altered sensoirum. Perural effusion, percardial rub was found least in range of 3.33-5% of patients in the study population. Similar presentation with pedal odema (88.7%), and elevated Blood pressure (85.7%) was found in prospective cross-sectional study was carried at the Komfo Anokye Teaching Hospital (KATH) in Ghana by Amoako et al. Anemia in CKD is typically normocytic, normochromic, and hypo proliferative.

Erythropoietin deficiency occurs in chronic renal failure which contributes to development of anemia in CKD patients (7).

Hypertension in CKD is complex and is a sequela of multiple factors, including reduced nephron mass, increased sodium retention and extracellular volume expansion, sympathetic nervous system overactivity, activation of hormones including the renin-angiotensin - aldosterone system, and endothelial dysfunction. (8).

Uremic encephalopathy usually presents with alterations in mental status fluctuating from mild sensorial clouding to delirium and coma. Renal failure results in accumulation of numerous organic substances that possibly act as cause of uremia in CKD (9).

In our study (8.33%) have found with altered consciousness can be due to uremic encephalopathy. Pedal odema, Ascites in CKD occurs mostly due to water retention due to a loss of GFR leading to sodium and fluid retention. Fluid moves into the extravascular space, due to increased hydrostatic pressure, causing pitting edema in the lower extremity Electrocardiogram findings of uremic pericarditis include diffuse ST and T-wave elevations. To distinguish these findings from an ST-segment elevation myocardial infarction, the ST and T-wave findings in pericarditis are typically diffuse and not localized to coronary artery territory. A pericardial rub is highly specific for acute pericarditis. It is generally heard over the left sternal border, louder at inspiration and on bending forward. In most cases, the rub is triphasic (audible in atrial, ventricular systole and ventricular diastole phases) and is of high frequency (10).

Table 5: potassium correlation

S. Potassium (meq/l)	Number of patients	Percentage
<3.5	7	11.66
3.5-6.5	31	51.66
>6.5	22	36.66

In our study Out of 60 patients, 22 (36.66%) were having k+ > 6.5 meq/l. While 31(51.66%) patients had K+ level between 3.5-5.5 meq/l, 7 (11.66%) had k+ <3.5 meq/l. This study is similar to studies done by Sylvanus et al in tertiary hospital in Tanzania in 2017 in which common complications in renal failure found was hyperkalemia. The renal system plays a vital role in potassium regulation, as evidenced by gross derangements consistently observed in those with CKD, including ESRD. (11)(12) When the glomerulus is unimpeded, the renal system will excrete and filter more than 800 mmol of potassium daily.

Given the reduced GFR associated with ESRD, hyperkalemia is one of the most common findings warranting emergent management (13).

Table 6: Anemia in CKD

HB level	Number	Percentage
>11 mg/dl	6	10
11-7 mg/dl	39	65
<7mg/dL	15	25
TOTAL	60	100

Out of 60 patients in study population 39 (65%) patients were presented with Hb 11-7 mg/dl. , 15 (25%) patients was severely Anemic with Hb <7mg/dl , while 6 (10%) patients had Hb >11mg/dl. Anemia in CKD is typically normocytic, normochromic, and hypo proliferative. Erythropoietin deficiency occurs in chronic renal failure which contributes to development of anemia in CKD patients (14). In development of anemia in patients with

CKD is driven by at least two factors. Patients of CKD produce less erythropoietin, a hormone produced by the kidneys that stimulates red blood cell production, secondly hepcidin—a hormone that (at high levels) impairs dietary iron, is elevated in patients of CKD (14).

Table 7: Hyperphosphatemia in CKD patients

S. Phosphate levels(mg/dl)	No of patients	Percentage
<4.7	8	13.33
4.7-6.5	35	58.33
>6.5	17	28.33
Total	60	100

Out of 60 patients in our study, 8 (13.33%) patients had phosphorus level within normal range with <4.7 mg/dl, 35(58.33%) patients had phosphorus range of 4.7-6.5 mg/dl while 17 (28.33%) patients had S. phosphorus range >6.5 mg/dl. This study is similar to studies done by Dhond up and Qian (15).

Serum phosphorous may remain normal in most CKD patients with eGFR >40 ml/min/1.73 m² due to the upregulation of PTH and FGF23 and attendant inhibition of proximal tubular phosphate reabsorption. As CKD progresses, renal phosphate excretory capacity becomes exhausted, and hyperphosphatemia ensues. Large cohort studies have consistently shown that hyperphosphatemia is associated with vascular calcification, (16) CKD progression (91) and increased risk of cardiovascular events and mortality. In a 2015 meta- analysis of 12 cohort studies of non-dialysis CKD patients (n = 25,500), an independent association of hyper phosphate Mia and risk of CKD progression and mortality was observed (17).

Collectively, the association of serum phosphorus with cardiovascular events and mortality begins at a high normal range of phosphorus (18) and occurs in patients

at all stages of CKD (19)(20), as well as in critically ill patients with dialysis-requiring acute kidney injury. Causal relationship between hyperphosphatemia and CKD progression and mortality, however, remains to be established.

Table 8: Mortality of CKD Patients

	No. of Patients	Percentage
Expired	7	11.6
Survived	53	88.3
Total	60	11

Out of 60 patients ,7 (11.6%) patients expired and 53 (88.33%) patients survived in Emergency department within 24 hours of presentation. Of this 7 only 1 patient was from stage IV of CKD while 6 patients were from stage V of CKD. No mortality was recorded in Stage III of CKD. This shows that risk of mortality increases with stages of CKD in accordance Rassa et al. (21).

Conclusion

- Male comprises about more about 63.33% than female in our study population as risk factors of CKD such as hypertension and smoking are commoner in males than females.
- Majority of the age group was in the range of of 41-60 years about 50 % due to several risk factors varies with age such Diabetes, Hypertension.
- Symptoms of volume overload like Dyspnea, Puffiness of face, abdominal distension was found most common in CKD patients in range from 76.66-71.66% followed by oliguria (70%), GIT symptoms (66.66%) such as nausea, vomiting, decrease appetite, Neuromuscular symptoms (50%) like muscle cramps, paresthesia. Symptoms of Lower urinary tract like dysuria, poor urinary stream, hesitancy and pruritus were found least common (2%) in study population.

- Most commonly CKD patients were pallor (90%), had pedal edema (73.33%) and Elevated Blood pressure (BP \geq 140/90).
- Electrolyte abnormalities commonly noted was Hyperkalemia and Hyperphosphatemia.
- Anemia and Hyperkalemia were the most common complication found in CKD patients in our study population.
- Mortality in CKD patients was most commonly noted in Stage V compared to stage IV and stage III of CKD. This showed that risk of mortality increases with decline in renal function.

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