Research Article

ETIOPATHOLOGICAL EVALUATION OF CHRONIC KIDNEY DISEASE IN DIABETES PATIENTS

Dr. Nabendu Pathak

Assistant Professor, Department of Pathology, Saraswati Institute Of medical Sciences , Hapur
 Email Id- drnabendupathak@yahoo.co.in

===
=

ABSTRACT

Background: Chronic kidney disease is a chronic kidney illness defined by the renal system's failure to maintain normal and low levels of potassium, water, sodium, hematocrit, blood pressure, protein metabolism products, and acid-base balance. The most prevalent underlying causes are hypertension and diabetes.

Aim: The current study aimed to investigate the etiology, biochemical profile, and clinical profile of patients with chronic kidney disease (CKD).

Methods: The current study included a total of 98 patients with chronic kidney disease. The etiology, biochemical profile, and clinical profile of subjects with chronic kidney disease (CKD).

Results: The current study found that diabetic nephropathy, followed by hypertension nephropathy, was the most frequent cause of chronic kidney disease. The disease's typical clinical presentation includes hypertension, pedal edema, pallor, lower limb swelling, and widespread weakness.

Conclusion: The current study shows that chronic kidney disease is a significant condition, with diabetic nephropathy being the most prevalent cause, and the most common presenting symptoms and signs being widespread weakness, oliguria, pedal edema, hypertension, and anemia. Early identification and care of CKD can prevent disease development and the need for a kidney transplant.

Keywords: Chronic renal disease; Diabetic nephropathy; Hypertension; Hypertensive nephropathy.

INTRODUCTION

CKD (chronic kidney disease) is a serious health concern that occurs in the end stage of renal parenchymal disease caused by a variety of etiologic causes and is associated with high morbidity and death. The repercussions of altered kidney function affect all organs in the affected person's body. Kidney injury can be confirmed using a variety of approaches, including abnormalities in renal imaging modalities, aberrant urine or blood composition, and histologic evidence.1

Chronic kidney disease is a global health concern that affects a great number of people of various ethnicities and races. Diabetes mellitus is a significant cause of chronic kidney disease. The quick and considerable growth in diabetic people worldwide has resulted in an exponential rise in chronic kidney disease. It is expected that a significant increase will coincide with an increase in diabetes. As of 2000, almost 4 lakh patients with end-stage renal illness were on dialysis in the United States and Japan. Chronic kidney disease affects roughly 1% of the Indian population, with an estimated 8 million out of a total of 1 billion people.

From 1992 to 2008, the National Health and Nutrition Education Survey (NHANES) revealed an almost 30% rise in the number of people in the United States with end-stage renal disease. More than half of the deaths in people with chronic renal disease are due to cardiovascular problems, with dyslipidemia being the most common risk factor for coronary artery disease.3 In CKD patients, reduced HDL and hypertriglyceridemia coexist with normal or elevated LDL values. Furthermore, chemical alterations such as oxidation and lipoprotein clearance are not seen

with normal processes, which induce an inflammatory response with the development of foam cells from macrophages, commencing the atherosclerotic process.4

Atherogenic lipoproteins also adversely alter endothelial function, resulting in arterial constriction and reduced blood flow to many bodily organs.

Chronic Kidney Disease has long been a major public health problem, with a rise in both new cases and mortality from end-stage renal disease.5 As a result, early detection and therapy in high-risk patients can slow disease progression to end-stage renal disease and reduce the need for a kidney transplant. As a result, the current study was done to evaluate the etiology, biochemical profile, and clinical profile of patients with chronic kidney disease (CKD).

MATERIALS AND METHODS

The current study examined the etiology, biochemical profile, and clinical profile of patients with chronic kidney disease (CKD). The study was done after getting authorization from the relevant Ethical committee. The research population consisted of 98 patients from both genders who visited the institute's Outpatient Department and had chronic renal disease.

The study's inclusion criteria were participants with increased blood creatinine levels that did not improve after three months, ultrasonography demonstrating tiny constricted kidneys, and a serum creatinine value of more than 2 mg%. Subjects with a GFR of more than 60ml/min and no ultrasonographic abnormalities in the kidneys were excluded, as were those under the age of 18.

Following the final inclusion of the research patients, complete demographics, histories, and physical examinations were performed on all included individuals, with the evaluation of primary renal illness in each.

All research participants had their laboratory and clinical parameters examined. The diagnosis was given for study participants without histopathologic confirmation. In patients with long-term diabetes, diabetic nephropathy was the predominant diagnosis. Diabetic nephropathy was also suspected as the cause in people with sluggish disease progression, albuminuria, and diabetic retinopathy.

Hypertensive nephropathy was regarded a diagnosis in patients with target tissue damage and a history of hypertension, whereas chronic glomerulonephritis was diagnosed in patients with nephrotic proteinuria, hypertension, and a history of edema. An ultrasonographic diagnosis of reflux nephropathy, polycystic kidney disease, and obstructive uropathy was made.

The Cockcroft-Gault formula was used to calculate creatinine clearance: Creatinine clearance = (140-age) x (weight in kg) x (0.85 if female) 72x (S.creatinine in mg/dl). The acquired data were statistically evaluated using SPSS software version 21 (Chicago, IL, USA), with one-way ANOVA and t-tests used to formulate the results. The data were presented as percentages, numbers, means, and standard deviations. The level of significance was set at $p < 0.05$.

RESULTS

The current clinical investigation assessed the etiology, biochemical profile, and clinical profile of patients with chronic kidney disease (CKD). The study comprised 98 participants of both genders with chronic renal disease. Table 1 summarizes the research individuals' demographic and illness characteristics. There were 19.38% (n=19) participants under the age of 40 and 80.61% (n=79) persons over 40. There were 71.42% (n=70) men and 28.57% (n=28) females in the current research.

Chronic kidney disease was caused by diabetic nephropathy in the majority of 40.81% (n=40) subjects, followed by hypertensive nephropathy in 20.40% (n=20) subjects, glomerulonephritis in 16.32% (n=16) subjects, reflux nephropathy in 5.10% (9n=5) subjects, solitary kidney and polycystic kidney disease in 4.08% (n=4) subjects, and multiple myeloma in 2.04% (9n=2) study subjects (Table 1).

After analyzing the biochemical parameters, it was discovered that 75.51% (n=74) study subjects had creatinine clearance of 0-15ml/min and 4.08% (n=4) had creatinine clearance of >30ml/min, serum creatinine levels of 2-5mg/dl were seen in 31.63% (n=31) study subjects, 5.1-12mg/dl in 56.12% (n=55) subjects, and >12 in 12.24% (n=12) subjects, and blood urea levels of 151-250mg/dl were seen in 25.51% (n=25) subjects and >250mg/dl in 6.12%. Hemoglobin values <5, 5-10, and >10mg/dl were detected in 5.10% (n=5), 69.38% (n=68), and 25.51% (n=25) patients, respectively.

Table 2 shows that 58.16% (n=57) of study participants had serum albumin levels <3.5g/dl, whereas 41.83% (n=41) had values 3.5-5g/dl. According to the ultrasonographic examination, 6.12% (n=6) of the study individuals had an expanded kidney, 47.95% (n=47) had a decreased kidney, and 45.91% (n=45) had a normal kidney, as indicated in Table 3. The current study evaluated several parameters in people with diabetic nephropathy and non-diabetic causes. It was discovered that 39 patients had non-diabetic causes and 59 subjects had an underlying etiology of diabetic nephropathy, with 39 men and 20 females involved.

The average blood creatinine levels in non-diabetic and diabetic nephropathy patients were 13.51±6.77 and 10.84±7.12mg/dl, respectively. Table 4 shows that patients with non-diabetic causes and diabetic nephropathy had an average creatinine clearance of 6.2±3.53 and 8.31±4.53 ml/min, respectively.

DISCUSSION

The current clinical study was designed to evaluate the etiology, biochemical profile, and clinical profile of patients with chronic kidney disease (CKD). The study comprised 98 participants of both genders with chronic renal disease. There were 19.38% (n=19) participants under the age of 40 and 80.61% (n=79) persons over 40.

There were 71.42% (n=70) men and 28.57% (n=28) females in the current research. Chronic kidney disease was caused by diabetic nephropathy in the majority of 40.81% (n=40) subjects, followed by hypertensive nephropathy in 20.40% (n=20) subjects, glomerulonephritis in 16.32% (n=16) subjects, reflux nephropathy in 5.10% (9n=5) subjects, solitary kidney and polycystic kidney disease in 4.08% (n=4) subjects, and multiple myeloma in 2.04% (9n=2) study participants. These demographics were similar to those investigated by Gabriela G Gomez et al6 in 2006 and Kher V et al7 in 2007.

Regarding the biochemical parameters, it was seen that creatinine clearance of 0-15ml/min was seen in 75.51% (n=74) study subjects and >30ml/min in 4.08% (n=4) study subjects, serum creatinine levels of 2-5mg/dl was seen in 31.63% (n=31) study subjects, 5.1-12mg/dl in 56.12% (n=55) subjects, and >12 in 12.24% (n=12) subjects, and blood urea levels of 151-250mg/dl were seen in 25.51% (n=25) subjects and >250mg/dl in 6.12%. Hemoglobin values <5, 5-10, and >10mg/dl were detected in 5.10% (n=5), 69.38% (n=68), and 25.51% (n=25) patients, respectively.

58.16% (n=57) of study participants had serum albumin levels <3.5g/dl, whereas 41.83% (n=41) had values between 3.5-5g/dl. These findings were consistent with the findings of Modi GK8 in 2006 and Csaba P et al9 in 2012, who used biochemical measures similar to those used in the current investigation. The ultrasonographic test found that 6.12% (n=6) of the research patients had larger kidneys, 47.95% (n=47) had smaller kidneys, and 45.91% (n=45) had normal kidneys.

The current study evaluated several parameters in people with diabetic nephropathy and non-diabetic causes. It was discovered that 39 patients had non-diabetic causes and 59 subjects had an underlying etiology of diabetic nephropathy, with 39 men and 20 females involved.

The average blood creatinine levels in non-diabetic and diabetic nephropathy patients were 13.51±6.77 and 10.84±7.12mg/dl, respectively. The average creatinine clearance was 6.2±3.53 and 8.31±4.53 ml/min in participants with non-diabetic and diabetic nephropathy as underlying causes, respectively. These findings were consistent with those of Lisa M et al10 in 2009 and Mclntyre NJ et al11 in 2011, who reported similar kidney function and ultrasonography findings in their respective investigations.

CONCLUSION

Within its limitations, the present study concludes that diabetic nephropathy is the most common cause of chronic kidney disease with common presenting symptoms being a generalized weakness, oliguria, pedal edema, hypertension, and anemia. CKD is associated with significant mortality and morbidity. Early detection and timely management of high-risk subjects can delay disease progression and prevent it to lead to end-stage renal disease and prevent renal transplant. However, the present study had a few limitations including small sample size, cross-section nature, and geographical area biases. Hence, more longitudinal studies with larger sample size and longer monitoring period will help reach a definitive conclusion.

REFERENCES

1. Vaidya, S.R. and Aeddula, N.R. (2009) Chronic Renal Failure. StatPearls Publishing, Treasure Island.
2. NR Hill, ST Fatoba, JL Oke, *et al.* Global prevalence of chronic kidney disease—a systematic review and meta-analysis. PLoS One. 2011;11:158765.

3. Lovre D, Shah S, Sihota A, Fonseca VA. Managing diabetes and cardiovascular risk in chronic kidney disease patients. Endocrinol Metab Clin North Am 2010;47:237-57.
4. Feingold KR, Grunfeld C. Introduction to Lipids and Lipoproteins. In: Feingold KR, Anawalt B, Boyce A, Chrousos G, Dungan K, Grossman A, Hershman JM, Kaltsas G, Koch C, Kopp P, Korbonits M, McLachlan R, Morley JE, New M, Perreault L, Purnell J, Rebar R, Singer F, Trence DL, Vinik A, Wilson DP, eds. Endotext. South Dartmouth (MA) 2010.
5. Gabriela k Gomez, Chronic kidney disease: a new priority for primary care. British journal of general practice, 2006 Br J Gen Pract. 2006;56:908–10.
6. Kher V. End-stage renal disease in developing countries. Kidney Int 2007;62:350-362.
7. Modi GK, Jha V: The incidence of end-stage renal disease in India: a population-based study. Kidney Int, 2006;70:2131-3.
8. Csaba P, Kovesdy, Evan H, Lott: Hyponatremia, Hypernatremia and Mortality in Patients with Chronic Kidney Disease with and without Congestive Heart Failure, Circulation AHA, 2010:111.
9. Lisa M, Einhon , BS, Min Zhan , an Doren Hsu. The frequency of Hyperkalemia and Its Significance in Chronic Kidney Disease. Arch Intern Med, 2009:169:1156-62.
10. Mclntyre NJ et al. Risk profile in kidney disease stage 3. Older versus younger patients; Nephron Clin Pract, 2010;119:269-76.

TABLES

S. No	Characteristics	Percentage (%)	Number (n)
1.	**Age (years)**		
a)	<40	19.38	19
b)	>40	80.61	79
2.	**Gender**		
a)	Males	71.42	70
b)	Females	28.57	28
3.	**Etiology**		
a)	Polycystic kidney disease	4.08	4
b)	Multiple myeloma	2.04	2
c)	Reflux nephropathy	5.10	5
d)	Solitary kidney	4.08	4
e)	Obstructive uropathy	7.14	7
f)	Glomerulonephritis	16.32	16
g)	Hypertensive nephropathy	20.40	20
h)	Diabetic nephropathy	40.81	40

Table 1: Demographic and disease characteristics in the study subjects

S. No	Parameters	Percentage (%)	Number (n)
1.	**Creatinine clearance (ml/min)**		
a)	>30	4.08	4
b)	15.1-30	20.40	20
c)	0-15	75.51	74
2.	**Serum creatinine levels (mg/dl)**		
a)	2-5	31.63	31
b)	5.1-12	56.12	55
c)	>12	12.24	12
3.	**Blood Urea Levels (mg/dl)**		
a)	<50	5.10	5
b)	50-150	63.26	62
c)	151-250	25.51	25
d)	>250	6.12	6
4.	**Hemoglobin (mg/dl)**		
a)	<5	5.10	5
b)	5-10	69.38	68
c)	>10	25.51	25
5.	**Serum Albumin (g/dl)**		
a)	<3.5	58.16	57
b)	3.5-5	41.83	41

Table 2: Clinical and laboratory parameters in the study subjects

S. No	Kidney size	Percentage (%)	Number (n)
1.	Increased	6.12	6
2.	Reduced	47.95	47
3.	Normal	45.91	45

Table 3: Ultrasonographic assessment of the kidney size in the study subjects

S. No	Parameters	Non-diabetic cause	Diabetic nephropathy
1.	No. of subjects	39	59
2.	Males	29	39
3.	Females	10	20
4.	Avg. creatinine clearance (ml/min)	6.2±3.53	8.31±4.53
5.	Avg. Serum creatinine (mg/dl)	13.51±6.77	10.84±7.12

Table 4: Comparison of non-diabetic and diabetic nephropathy size in the study subjects