Original Article

Peripheral Neuropathy in Chronic Kidney Disease (CKD)

Neuropathy in Chronic Kidney Disease

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ABSTRACT

Objective: To study the prevalence of peripheral neuropathy and evaluate the clinical nerve dysfunction in patients with chronic kidney disease.

Study Design: Prospective study

Place and Duration of Study: This study was conducted at the Medical ward Nishtar hospital, Multan from May 2018 to May 2019.

Materials and Methods: Eighty patients of clinically and biochemically proven chronic kidney disease were selected for study. Non probability consecutive sampling was used. Patients were assessed or both sensory and motor nerve dysfunction. SPSS software was used for data analysis. Main variables of study were creatinine clearance and neuropathy of peripheral nerves.

Results: Affected patients percentage with reference to overt and subclinical neuropathy was noted as 67.5%. Overt neuropathy and subclinical neuropathy observed as 35.2% and 64.8%, respectively. Patients affected with percentage with reference to the type of peripheral neuropathy were noted 67.5%. Sensory-motor, sensory and motor was observed as 31.5%, 14.8% and 53.7%, respectively.

Conclusion: Peripheral neuropathy is highly associated with chronic kidney disease and severity and prevalence of neuropathy increases with worsening in renal failure. Early diagnosis and strict compliance required to overcome this condition.

Key Words: Chronic Kidney disease, Peripheral neuropathy, Hemodialysis, Sensory nerve, Motor nerve.

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INTRODUCTION

Chronic kidney disease is associated with peripheral neuropathy[1]. Generally, patients would not come for examination of dysfunction of peripheral nerve supply until they looked for or asked for. Now in these days' patients long term survival rate is improving because of latest advancement in medical treatment[2]. Recent improvement in CKD management with hemodialysis, peritoneal dialysis and transplant brought revolution. Lifespan of patients also improved due to latest treatment improvement[3].

It is essential to know about complications of CKD, if patients survive for long time, peripheral neuropathy is one of common complications of CKD[4]. Neuropathy in CKD is treatable. Signs and symptoms of CKD are in all cases but cases are different in nature[5]. Neuropathy is symmetrical, distal and mixed motor and sensory in nature affecting 65% CKD patients mostly lower limbs as compared to upper limb. Strict control on patient's serum creatinine with on time dialysis and medical compliance reversal and progression of neuropathy is possible[6].

Peripheral neuropathy develops in male patients is greater than female and this difference is unexplained yet[7]. Intensity of disease and chronicity are main contributing features in peripheral neuropathy[8]. Existence of peripheral neuropathy clearly suspected and described in previous literature but metabolic disturbance of CKD and its dominated state of coma was not explained with its chronicity[9,10]. Many reports were conducted on this topic but no local study is available, so in this study incidence and severity of nerve dysfunction was assumed in CKD patients to fulfill the local reference gap.

MATERIALS AND METHODS

This prospective study was conducted at medical ward Nishtar hospital; Multan from 10th May 2018 to 10th May 219 after obtaining permission from hospital ethical board. Written consent was obtained from patients after detail information of study. Non

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probability consecutive sampling was used for data collection. Clinically and biochemically diagnosed cases of CKD were included in the study patients with serum creatinine >2mg, do not on dialysis and creatinine clearance < 40ml/mt were included. Patience with other contributing factors of peripheral neuropathy like diabetes was excluded from the study.

Electrophysiological tests were performed for sensory and motor neuropathy. Median right ulnar, tibial nerve, common peronal and sural nerve supply was tested. All neurological and liver related findings were noted. SPSS version 23 was used for data analysis mean and SD was calculated for numerical values and frequencies (percentages) were calculated for qualitative data. P value less than or equal to 0.05 was taken as significant.

RESULTS

Eighty patients were included in this study, both genders. Gender distribution revealed as n=54 (67.5%) males and n=26 (32.5%) females. (Figure. I). The mean duration of CKD was 3.87±1.89 years. The distribution of CKD verses peripheral nerve dysfunction was shown in table I.

Table No.1: Distribution of peripheral nerve dysfunction in CKD patients versus duration of disease

Duration of CKD (year)	No. of patients with %	Peripheral Nerve Dysfunction
<1	n=17 (21.3%)	n=13 (76.5%)
1-3	n=28 (35%)	n=19 (67.9%)
3-5	n=20 (25%)	n=14 (70%)
>5	n=15 (18.8%)	n=9 (60%)
Total	**n=80 (100%)**	**n=55 (68.8%)**

Table No.2: Patients affected with percentage with reference to overt and subclinical neuropathy

Variable	N, (%)
Overt neuropathy	n=19 (35.2%)
Subclinical neuropathy	n=35 (64.8%)
Total	n=54 (67.5%)
Patients affected with percentage with reference to the type of peripheral neuropathy	
Sensory-motor	n=17 (31.5%)
Sensory	n=8 (14.8%)
Motor	n=29 (53.7%)
Total	n=54 (67.5%)

Affected patients with percentage with reference to overt and subclinical neuropathy was noted as n=54 (67.5%). While, overt neuropathy and subclinical neuropathy observed as n=19 (35.2%) and n=35 (64.8%), respectively. Patients affected with percentage with reference to the type of peripheral neuropathy was noted n=54 (67.5%). While, sensory-motor, sensory and motor were observed as n=17 (31.5%), n=8 (14.8%) and n=29 (53.7%), respectively. (Table. 2).

The mean creatinine clearance 14.33±4.81 ml/mt.Distribution of male and female patients affected with reference to creatinine clearance was shown in table 3.

Table No.3: Distribution of male and female patients affected with reference to creatinine clearance

Creatinine clearance ml/mt	Male	Female
<15	n=30 (75%)	n=10 (25%)
26-29	n=14 (60.9%)	n=9 (39.1%)
30-59	n=10 (58.8%)	n=7 (41.2%)

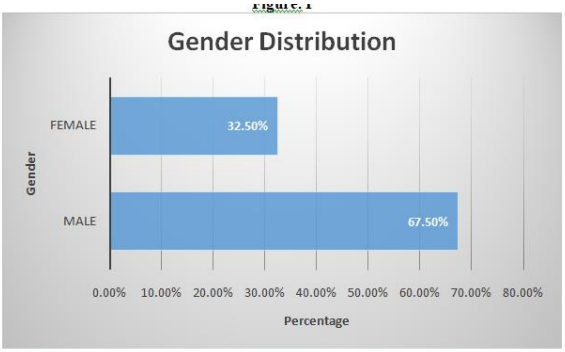

Figure No. I: Gender of patients with percentage with regard to disease.

DISCUSSION

Common and recognized complication of CKD is peripheral neuropathy. It may lead to peripheral nervous system, morbidity and mortality. Renal derangement is the contributing factor of neuropathy[11]. In a study conducted by Sultan et al[12] reported that renal derangement or CKD effect the nervous system. Peripheral neuropathy is the complication of CKD.

In a study conducted by Kumar et al[13] and concluded the involvement of CKD in disturbance of neurological system. Neuropathy is the main complication. He also reported that severity of disease has import on patient's neurological condition. Sensory neuropathy was 34% and motor neuropathy was 16% observed.

Babu et al[14] conducted a study on this topic and focused on association of CKD and peripheral neuropathy. In that study impact of age was also observed on neuropathy and its severity. Age>65 years is more prove to peripheral neuropathy in CKD.Rathankumar et al[15] completed a study in 2018 on peripheral dysfunction and CKD and conclude that distal sensory and motor neuropathy our two common types of peripheral neuropathy associated with CKD. In that study 64.8% of patients have peripheral neuropathy. Male patients with creatinine clearance having less that 15ml/mt are on greater risk.

Another study was conducted by Arnold et al[16]reported that CKD is highly associated with neurological complications which may lead to sourobidity and neutrality. May chronic neurological complications like stroke, dementia and cognitive impairment were also observed.

In a study by Bolton et al[17] observed similar findings and reported that a number of peripheral neurological disorders are associated with CKD. Cause behind this pathology is production of toxins in CKD. Renal transplantation is an option for its recovery. Another study was conducted by Nielsen et al[18]and concluded that 77% patients with CKD have peripheral neuropathy and remaining have signs of peripheral neuropathy. In that study slowing of nerve conduction was observed in patient with renal derangement since last 2 years.

Aggarwal et al[19] conducted a study on peripheral neuropathy in CKD patients and reported that sensory and motor neuropathies are associated with severity of disease or renal function; he observed symptomatic neuropathy in 51% of predialysis patients. Similar study was conducted by Krishnan et al[20] in 2005 and reported 91% peripheral neuropathy in chronic kidney disease. This association was reported irreversible that cannot be reversed with early or delayed recovery from renal derangement.

CONCLUSION

Peripheral neuropathy is highly associated with chronic kidney disease and severity and prevalence of neuropathy increases with worsening in renal failure. Early diagnosis and strict compliance required to overcome this condition.

Author's Contribution:

Concept & Design of Study:	Nadeem Ullah
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Final Approval of version:	Nadeem Ullah

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