**Benha Journal of Applied Sciences (BJAS)** **print : ISSN 2356–9751**
**Vol.(5) Issue(2) Part (1) (2020), xxx-xxx** **online : ISSN 2356–976x**
**http:// bjas.bu.edu.eg**

# Clinical and Electrophysiological Study of Peripheral Neuropathy in Upper Limb of Children on Hemodialysis Treatment

E.A.Nawar and W.A.EL Khayat
Pediatrics Dept., Faculty of Medicine, Benha Univ., Benha, Egypt
E-Mail:Dr walla abdallah@gmail.com

**Abstract**

This study looked on figure out the predominance and predictors for fringe neuropathy Previously, know youngsters for constant kidney sickness (CKD). May be should assess the clinical What's more electrophysiological abnormalities in upper limbs about kids once hemodialysis medicine In dialysis unit at Benha college clinic. Our investigation might have been acase control consider (descripitive What's more comparative). Those contemplate will a chance to be directed with respect to 60 kids those CKD gathering comprised of 30 patients, constantly on of them complained starting with limit phase irreversible renal failure, 20 on hemodialysis (GFR<15ml/min/1. 73m2) What's more 10 looking into preservationist medicine (GFR<60ml/min/1. 73m2) isolated as stated by shwartz recipe.

## 1-Introduction

The K/DOQI workgroup characterized CKD as takes after: those vicinity from claiming markers about kidney harm for ≥3 months, Similarly as characterized Toward structural or utilitarian abnormalities of the kidney with or without a diminished glomerular filtration rate (GFR), that is showed by Possibly obsessive abnormalities or different markers of kidney damage, including abnormalities in the blood, urine, or clinched alongside imaging tests or GFR <60 mL/min per1. 73 m2 for ≥3 months, with or without kidney harm. Those more extensive suggestion from claiming this normal definition may be that patients with CKD camwood make distinguished sooner thereabouts that progression towards end-stage renal sickness (ESRD) camwood a chance to be ended alternately regulated [1].

Fringe neuropathy (PN) will be An jumble that influences those cell body, axon alternately myelin from claiming engine alternately fringe tactile neurons Furthermore camwood individually make arranged as neuropathological, axonal alternately demyelinating. This state may be Possibly inherited alternately obtained and might make further subdivided under sensory, engine alternately autonomic. PN need an extensive range about makes (such as dietary deficiencies and dangerous neuropathies and in addition clinical presentations; however, consistent What's more repeating agony happens Previously, Practically every one sorts for this issue [2].

The general predominance from claiming fringe neuropathy may be 2. 4%. However, this amount expands exponentially in specific agdistis groups, and it might Actually a chance to be a disparage since traumatic reasons need aid not incorporated in this rate [3].

Fringe neuropathy happens Previously, 60-100% from claiming patients who are submitted on dialysis because of incessant kidney sickness (CKD). Uremic neuropathy (UN) happens when renal brokenness debilitates filtration, prompting those amassing about natural waste. This may be apparent over patients with lessened glomerular filtration rate (GFR) as a rule attributed should end-stage renal infection (ESRD) [4]. Umteenth may be An distal symmetric sensorimotor polyneuropathy that commonly influences more level limbs Also will be because of length-dependent axonal corruption What's more optional central reduction from claiming myelin sheaths [5].

This will be viewed as a demyelinating condition which prompts axonal degeneration Also passing [6].

## 2. Subjects& methods

### 2.1Study design

Case control study (Descriptive and comparative).

It conducted over 6 months from febreuary2019 to July 2019.

### 2.2Size of samples

The study will be conducted on 60 children

Informed written consent will be taken from their parents to share in this study.

### 2.3Criteria

**A- Inclusion criteria**

- Age: 3-18 a considerable length of time old.
- both sex.
- Patients looking into hemodialysis medicine.
- Patients once preservationist medicine for incessant kidney sickness stage iv.
- prohibition criteria:.
- over 18 years, under 3 A long time.
- those tolerant with dm.
- those tolerant with other therapeutic condition that make fringe neuropathy.

### 2.4 Methods

All children were subjected to the following:

### 2.5History taking

### 2.6Examination

### 2.7Neurological examination

### 2.8Laboratory investigation

- Blood samples have been taken before dialysis session and before electrophysiologic examination:
- KFT: Urea, creatinine.

- Serum electrolytes: Na, K, Ca.
- CBC,ABG

**Electrophysiological studies**

**3.Results**

There is no significant difference in sex and residence in the studied groups but the passive smoking and the family history of CRF is statistically significant as shown in table [1].

**Table (1)** Comparison between group I (n=20) and group II (n=10), group III (n=30) regarding demographic data, FH for CRF and FH for peripheral neuropathy.

| | Group I (n=20) | | Group II (n=10) | | Group III (n=30) | | Test of sig. | P-value |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | | |
| **Sex** | | | | | | | | |
| Male | 10 | 50 | 2 | 20 | 16 | 53.3 | 3.64* | 0.176 |
| Female | 10 | 50 | 8 | 80 | 14 | 46.7 | | |
| **Age** | | | | | | | | |
| Min. – Max. | 8 – 18 | | 8 – 18 | | 8-18 | | 36.6** | .000 |
| Mean ± SD | 15.5 ± 3.0 | | 12.5 ± 3.5 | | | | | |
| **Residence** | | | | | | | | |
| Urban | 10 | 50 | 3 | 30 | 23 | 76.7 | 8.07* | .018 |
| Rural | 10 | 50 | 7 | 70 | 7 | 23.3 | | |
| **Passive smoking** | | | | | | | 7.92* | 0.019 |
| Positive | 11 | 55 | 9 | 90 | 26 | 86.7 | | |
| Negative | 9 | 45 | 1 | 10 | 4 | 13.3 | | |
| **Family history of CRF** | | | | | | | 13.3* | .001 |
| **Yes** | 6 | 30 | 0 | 0 | 0 | 0 | | |
| **No** | 14 | 70 | 10 | 100 | 30 | 100 | | |
| **Family history of peripheral neuropathy** | | | | | | | 8.57* | .014 |
| **Yes** | 4 | 20 | 0 | 0 | 0 | 0 | | |
| **No** | 16 | 80 | 10 | 100 | 30 | 100 | | |

value of Chi square test, **: value of ANOVA test. P-value is significant when its value is less than 0.05

The differences in the above baseline factors between the studied three groups were significant except for sex. Multivariate analysis is required to adjust for these factors

**Table (2)** Comparison between group I, group II and group III according to neurological symptoms, neurological examination and autonomic neuropathy.

| | Group I (n=20) | | Group II (n=10) | | Group III (n=30) | | Test of sig.* | P-value |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | | |
| **Symptoms of PN** | | | | | | | | |
| Yes | 5 | 25 | 3 | 30 | 0 | 0 | 9.37 | .009 |
| No | 15 | 75 | 7 | 70 | 30 | 100 | | |
| **Symptoms of autonomic neuropathy** | | | | | | | | |
| Yes | 6 | 30 | 1 | 10 | 0 | 0 | | .005 |
| No | 14 | 70 | 9 | 90 | 30 | 100 | 10.5 | |
| **Neurological examination** | | | | | | | | |
| Normal | 9 | 45 | 10 | 100 | 27 | 90 | 17.24 | .000 |
| Abnormal | 11 | 55 | 0 | 0 | 3 | 10 | | |

Chi-square test with Monte-Carlo method

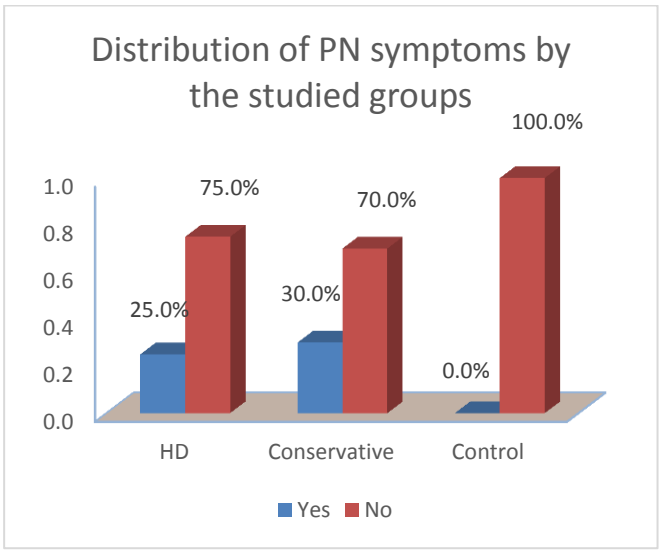
The three groups significantly differed in frequencies of neurological symptoms, neurological examination and autonomic neuropathy; HD patients showed the highest percentages compared with other groups.

**Table (3)** Symptoms of PN among uremic neuropathy patients in both group.

| | | Neuropathy | | Test statistic | Sig. |
|---|---|---|---|---|---|
| | | Yes | No | | |
| **Symptoms of PN** | Yes | 8 (100%) | 0 (0 %) | 41.1 | 0.00** |
| | No | 3 (5.8%) | 49 (94.2%) | | |
| **Symptoms of autonomic neuropathy** | Yes | 6 (85.7%) | 1 (14.3%) | 24.03 | 0.00* |
| | No | 5 (9.4%) | 48 (90.6%) | | |

Values expressed as frequencies (percentage), *: significant difference at p< 0.05, **: significant difference at p< 0.01. Chi-square test was used.

There was a significant association between neuropathy and symptoms of each PN and autonomic neuropathy (P < 0.01).




**Fig(1)** Distribution of symptoms by the studied groups

The figure show that 25% of group I and 30% of group II had symptoms of neuropathy.

## 4. Discussion

Fringe nerve neuropathy could make ordered approximately under two obsessive types: )one basically because of axonal degeneration, What's more one primarily because of demyelination [13]. Electrophysiologically, nerve conduction investigations of the four extremities need showed diminished plentifulness of the evoked potentials in the previous kind Also diminished conduction speed in the last sort. The neurotic state for uraemic neuropathy is a various neuropathy because of axonal degeneration of the tangible Furthermore engine nerves beginning starting with those easier extremities with auxiliary improvement from claiming demyelination [14]. on assess the vicinity alternately nonattendance about uraemic neuropathy in patients undergoing haemodialysis, we led nerve conduction investigations of the more level extremities for haemodialysis patients What's more compared the outcomes for the individuals for ordinary subjects. Those tangible nerve conduction investigations indicated diminishment of the average plantar nerve conduction speed in the haemodialysis patients compared with those ordinary subjects. Recording might have been incomprehensible to 13% of the haemodialysis patients for the sural nerve Also On 46% to those average plantar nerve. However, recording might have been also difficult done 10% of the typical subjects for the sural nerve Also On 15% to the average plantar nerve. Those reason for this disappointment of recording might bring been those impact of age [15] on little plentifulness evoked potentials of a tangible nerve are referred to on make influenced Toward agincourt. On the different hand, those CMAP and the f wave of the engine nerves were got effectively On the whole those haemodialysis patients. The tibial nerve MCV diminished compared for that of the ordinary subjects. However, the tibial nerve DML, which reflects aggravation of the distal fringe nerve, and the insignificant f wave inactivity [16] which will be those mossycup oak delicate parameter over identifying somewhat deferred conduction watched over fringe axonal neuropathy, were prolonged. From the electrophysiological results, we predicted a helter skelter frequency about uraemic neuropathy to patients undergoing haemodialysis.

The haemodialysis patients were partitioned under three gatherings as stated by the span about haemodialysis, and the values measured in the nerve conduction investigations of the Assemblies were compared. For prolongation of the span about haemodialysis, the average nerve DML might have been prolonged, and the MCV and the SCV diminished in the upper extremities. On the other hand, in the more level extremities, there were no evident progressions in the tibial nerve MCV, those sural nerve SCV, and the average plantar nerve SCV. On reviewing these results, the known expanded occurrence for carpal tunnel syndrome Previously, haemodialysis patients with prolongation from claiming haemodialysis span might serve Concerning illustration a great similar instance (31% to 57% at more than 10 years, What's more 71% toward more than 20 years). Since those average nerve evoked potential might have been gotten from those abductor pollicis muscle What's more pointer Toward fortifying those wrist joint, the average nerve DML Also SCV may bring been influenced Eventually Tom's perusing average neuropathy due to carpal tunnel syndrome. Those lower arm engine nerve conduction velocity, which speaks to those work of the nerves proximal of the carpal tunnel, likewise diminished. This decline might a chance to be clarified Eventually Tom's perusing advancement of retrograde degeneration of the nerve fibres, [17] What's more specific damage of the thick fibresby mechanical layering In those entanglement purpose. Therefore, those impact for entanglement neuropathy on the average nerve impedes assessment of the seriousness from claiming uraemic neuropathy utilizing the upper extremities. The more level extremities permit exact assessment of the seriousness of uraemic neuropathy a result they infrequently create tarsal tunnel syndrome [18], which will be a entanglement neuropathy. Our nerve conduction investigations of the more level extremities exhibited the nonattendance from claiming transforms in the tibial nerve DML, the tibial nerve MCV, those values measured by the tibial nerve f wave conduction study, those sural nerve SCV, and the average plantar nerve SCV in the tolerant Assemblies with different haemodialysis durations. Main those tibial nerve DML might have been prolonged then afterward five quite some time. The average plantar nerve SCV, which reflects those A large portion distal fringe nerve function, might have been not reduced, What's more there were no noteworthy progressions in the different qualities measured, including the insignificant f wave inactivity [19] ,which doesn't go with diminishment in the tibial nerve MCV and is A large portion proliferation Around every last one of nerve conduction investigations. Reproducible of the tibial nerve DML may be problematic; its worth need demonstrated those A large portion variability "around nerve conduction parameters. Indeed going in the nerve conduction studies, those estimation qualities from claiming tibial nerve DML change greatly, Furthermore their reproducible need been acknowledged troublesomeness. The negligible f wave inactivity might have been the any rate as variable for a variance rate for 5%, and the tibial nerve MCV indicated An variance rate from claiming give or take 10%. However, those tibial nerve DML shifted greatly, for An variety rate for 24%, and the low reproducible need been attributed should insufflate force level from claiming incitement of the tibial nerve during the lower leg because of a portion anatomic factors. A number past reports bring depicted ordered diminishments in the nerve conduction velocities Throughout haemodialysis [20]. In the display study, s were as of a f wave conduction study, which indicated lesquerella variance of the measured values, enabled us should exhibit that the seriousness from claiming uraemic neuropathy remains unaltered Throughout haemodialysis.

## 5. Conclusion

Starting with this ponder we finish up that:. Fringe neuropathy will be as a relatable point "around know youngsters with constant renal disappointment once hemodialysis What's more with respect to preservationist treatment, from that point onwards An multidisciplinary methodology for prevention, analysis and medication for these sorts about difficulties is essential. AndThe A large portion regular kind about uremic neuropathy may be sensorymotor, poly neuropathy.

## 6. Recommendation

More than quarter of the Youngsters with CKD phases iv Furthermore v in this investigation needed fringe neuropathy. We presume that occasional electrodiagnostic investigations ought be performed in know youngsters for CKD should assess to fringe neuropathy to the reason for upgrading medicinal forethought.

## References

[1] KDOQI Clinical Practice Guideline for Nutrition in Children with CKD: update. Executive summary. Am J Kidney Dis.Vol. 53(3 Suppl 2),PP. S11-104, 2008.

[2] N.P.Staff ,A.J.Windebank: Peripheral neuropathy due to vitamin deficiency, toxins, and medications. Continuum (MinneapMinn).Vol. 20(5 Peripheral Nervous System Disorders),PP. 1293-306, 2014.

[3] U.K.Misra ,J. Kalita , P.P.Nair: Diagnostic approach to peripheral neuropathy. Ann Indian Acad Neurol.Vol.11(2),PP. 89-97, 2008.

[4] C.R.Camargo, J.H.Schoueri, B.D.Alves andG.R.Veiga: Uremic neuropathyRev Assoc Med Bras (1992). 2019 Mar.Vol.65(3),PP. 469-474. doi: 10.1590/1806-9282.65.3.469. 2019.

[5] S. Ghazan-Shahi , T.JKoh , C.T.Chan: Impact of nocturnal hemodialysis on peripheral uremic neuropathy. BMC Nephrol, Vol.16,PP.134,(2015).

[6] G. Said . Uremic neuropathy. Handb Clin Neurol.Vol. 115,PP.607-12, 2013.

[7] S.Varma.: Electromyography and neuromuscular disorders: Clinical-electrophysiologic correlations, edited by David C. Preston and Barbara E. Shapiro, 664 PP., Elsevier Saunders, 2012, . Muscle & nerve, Vol.48(2), PP. 308-308, 2013.

[8] J.H.Jhee, Y.S. Joo, Y.K. Kee, S.Y. Jung, S. Park, C.Y.Yoon and J.T. Park:Secondhand Smoke and CKD. Clinical Journal of the American Society of Nephrology.Vol.14(4), PP. 515-522, 2019.

[9] J.L.Seifter,J.Feehally ,J Floege and R.J.Johnson : Neurologic complications of chronic kidney disease . Comprehensive Clinical Nephrology,Vol.3rd ed,Vol.3(25), PP.887–891, 2007.

[10] J.Michael and Aminoff: in Aminoff's Neurology and General Medicine (Fifth Edition), Vol.3(14),PP.354-361, 2014.

[11] B.Dushyanth , M.Sarat , B.Apparao :Clinical and Electrophysiolo-gical Study of Peripheral Neuropathies in Predialysis Chronic Kidney Disease Patients and Relation of Severity of Peripheral Neuropathy with Degree of Renal Failure. J Neurosci Rural Pract.Vol.8(4),PP. 516–524, 2017 .

[12] T. Ogura :A pathophysiological study of carpal tunnel syndrome in patients with long-term hemodialysis. J Kyoto Pref Univ Med, Vol. 103,PP.1113–1128, 1994.

[13] T. Yasuda , G.Sohue :Pathophysiology and origin of a neuropathy. Journal of Medical Technology,Vol. 40,PP.760–766, 1996.

[14] P.K.Thomas , K.Hollinrake , R.G.Lascelles :The polyneuropathy of chronic renal failure. Brain, Vol. 94,PP.761–780, 1971.

[15] R.J.Guiloff , R.M.Sherratt: Sensory conduction in medial plantar nerve: normal values, clinical applications, and a comparison with the sural and upper limb sensory nerve action potentials in peripheral neuropathy. J Neurol Neurosurg Psychiatry, Vol, 40,PP.1168–1181, 1997.

[16] Kimura J:Medical technology of neuropathy. Journal of Medical Technology. Vol. 40,PP.757–759, 1996.

[17] Y.Yamano ,Y. Okunobou Y, T.Inoue T: Follow up studies of severe carpal tunnel syndrome with reduced conduction velocity of proximal segment. Orthopaedic Surgeryand Traumatology , Vol. 29,PP.1767–1773, 1989.

[18] Samoto N, Akiyama T, Nishida T: A case of tarsal tunnel syndrome due to an amyloid tumor in a long-term hemodialysis patient. Orthopaedic Surgery and Traumatology.Vol. 40,PP.1408–1412, 1992.

[19] Kohara N, Kimura J, Kaji R: Inter-trial variability of nerve conduction studies: multicenter analysis. Japanese Journal of Electroencephalography and Electromyo-graphy. Vol. 22,PP.384–393, 1994.

[20] Okuda Y, Asai H, Yasui A:.Changes of nerve conduction velocity in patients undergoing long-term hemodialysis. J Jpn Soc Surg Hand, Vol. 6, PP.377–381, 1989.