



ELECTROPHYSIOLOGICAL CHANGES IN HYPERTENSIVE CHRONIC KIDNEY DISEASE PATIENTS WITH UREMIC NEUROPATHY

Neurology

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ABSTRACT

Aim: To study about the Electrophysiological changes in hypertensive chronic kidney disease patients with neuropathy.

Methods: This study is a prospective analytical study carried out in electrophysiological unit of Govt Mohan Kumaramangalam Medical College and Hospital, Salem, Tamilnadu from August 2015 to May 2016. 46 patients aged between 30 to 60 years were chosen for this study.

Inclusion criteria: Hypertension CKD patients with uremic neuropathy in pre, post dialysis state, post transplant states.

Exclusion criteria: Uremic neuropathy due to Diabetes mellitus and other causes of CKD are excluded.

Results: This Study is done in 46 patients with uremic neuropathy (35 males and 11 females). Nerve Conduct Study (NCS) done in pre dialysis, immediate post dialysis, post transplant state. In pre dialysis state motor nerve conduction study (MNCS) revealed, mean - latency (4.3ms), amplitude (4mv), velocity (42m/s) in right median nerve. Sensory nerve conduction study showed, mean latency (3.6ms), amplitude (8.2 μ v), velocity (43.2m/s) In Post dialysis state MNCS showed, mean latency (3.8ms), amplitude (10.9mv), velocity (49m/s) and SNCS showed mean latency (3.4ms), amplitude (15.2 μ v) and velocity (51m/s) Post dialysis state showed statistically significant reduction in latency ($p < 0.001$), increase in amplitude ($p < 0.001$) and increase in mean velocity for a transient period. Post transplant patient showed normal latency, (3.2ms) amplitude (10.3mv), velocity (51 m/s). SNCS showed normal latency (2.6ms), amplitude (21.8 μ v) and velocity (52 m/s). There is no significant change in F-wave pattern.

Conclusion: Electrophysiological studies in hypertension CKD patients' revealed, uremic neuropathy in pre dialysis state, significant improvement in post dialysis state, and normal electrophysiological studies in post transplant state. This study shows uremic neuropathy itself is an indication of need of renal replacement therapy.

KEYWORDS

Hypertension, chronic kidney disease, neuropathy, renal replacement therapy.

Introduction:

Uremic neuropathy is most common problem in chronic kidney disease patients. Electrophysiological evaluation helps us in the prognosis of neuropathy in pre dialysis, post dialysis and post transplant state.

Aim:

To study about the Electrophysiological changes in hypertensive chronic kidney disease patients with neuropathy.

Methods:

This study is a prospective analytical study carried out in electrophysiological unit of Govt Mohan Kumaramangalam Medical College and Hospital, Salem, Tamilnadu from August 2015 to May 2016. 46 patients aged between 30 to 60 years were chosen for this study (35 males and 11 females).

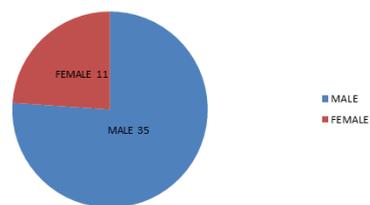
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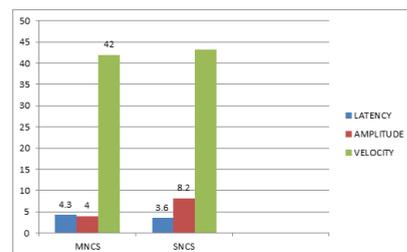
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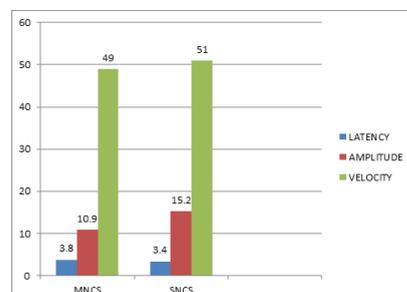
TOTAL PATIENTS



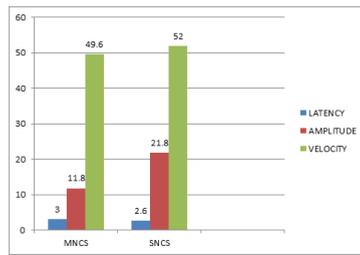
PREDIALYSIS - NCS STUDY



POST DIALYSIS - NCS STUDY



POST TRANSPLANT NCS STUDY



DISCUSSION

Peripheral Neuropathy Is due to disease affecting the peripheral nerves, results in impaired sensory and motor function. Neuropathy may be motor or sensory or autonomic neuropathy. Neuropathy may be mono or poly neuropathy. Peripheral neuropathy may be acute or chronic. Neuropathy may be due to metabolic, nutritional, infective, toxic, neoplastic or immune mediated.

Hypertension causes chronic kidney disease due to hyaline arteriolar and nephrosclerosis. Hypertension chronic kidney disease patients are prone to uremic neuropathy because of uremic toxins. Available treatments for uremic neuropathy are dialysis and renal transplantation. Peritoneal dialysis is associated with lower incidence of uremic neuropathy than hemodialysis because of better removal of mid weight molecules.

The exact mechanism of uremic neuropathy is not known. The postulated theory is uremia mediated axonal membrane dysfunction and inhibition of Na⁺/K⁺ activated ATPase resulting in energy failure to the axon causing axonopathy. Energy failure is critical at nodes of ranvier because it needs more energy for impulse conduction and axonal transport¹.

The exact uremic toxins are remain unproven The possible uremic toxins are small water soluble compounds such as urea, phosphorus, purines, creatinine, guanidines, the middle and large molecules such as advanced glycosylated end products, parathyroid hormone, oxidation products, beta-2 microglobulin, protein bound compounds such as p-cresol, indoles, homocysteine, hippuric acid, polyamines¹.

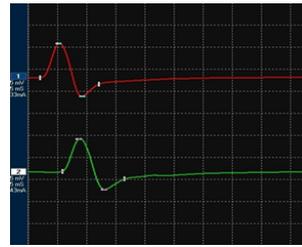
Uremic neuropathy is distal sensorimotor polyneuropathy caused by uremic toxins. Symptoms are paresthesia, weakness and atrophy of muscles. Chronic dialysis may prevent neuropathy if begun in early. Renal transplantation is most successful method to prevent neuropathy¹.

Electrophysiological studies in uremic patients after dialysis showed improvement in amplitude due to removal of uremic toxins.

Here we studied the electro physiological changes in uremic patients with hypertensive chronic kidney disease.

Hypertensive chronic kidney disease leads to neuropathy due to accumulation of uremic toxins, depends on the uremic toxins load, produces primary axonal with secondary myelin damage manifest as dying back neuropathy clinically presents with sensory symptoms and denervation atrophy¹.

PRE DIALYSIS – MNC



PRE DIALYSIS - SNC



Uremic neuropathy is an indication for renal replacement therapy, both hemo and peritoneal dialysis gives statistically significant improvement in uremic neuropathy for a transient time².

Renal transplantation shows clinically and electro physiologically good outcome in uremic neuropathy^{3,4}.

Conclusion:

Electrophysiological studies in hypertension CKD patients' revealed, uremic neuropathy in pre dialysis state, significant improvement in post dialysis state, and normal electrophysiological studies in post transplant state. This study shows uremic neuropathy itself is an indication of need of renal replacement therapy.

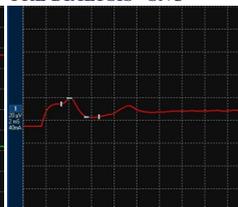
REFERENCES

1. Uremic Neuropathy – Yi Pan et al, Florian P Thomas et al
2. Uremic neuropathy and the analysis of electrophysiological changes – Mansouri B et al.
3. Uremic neuropathy treatment and management – Yi pan et al
4. Electrophysiological changes in uremic neuropathy after successful renal transplantation – Charles F Bolton
5. A clinical and electrophysiological study of peripheral neuropathies in predialysis chronic kidney disease patients and relation of severity of peripheral neuropathy with degree of renal failure – Dushyanth Babu Jasti et al,
6. Peripheral neuropathy in chronic uremia: a study of clinical and electrophysiological features and changes in patients on intermittent peritoneal dialysis. – Bidhun Kuriakose et al

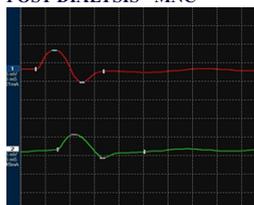
PRE DIALYSIS – MNC



PRE DIALYSIS - SNC



POST DIALYSIS - MNC



POST DIALYSIS - SNC

