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A Case Report on Nerve Conduction in Right Limb Muscular Atrophy

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Abstract: ***Nerve conduction studies (NCS) are used to assess peripheral nerve function. Actually one side peroneal muscular atrophy observed in individuals is very rare. A case of 25 years old male has muscle atrophy in right leg. Nerve conduction report showed, sensory nerve conduction (SNCV) and F-wave was normal in both side (right and left)and motor nerve action potential (MNAP) of median, ulnar and bilateral posterior tibial nerve was normalin upper and lower limb respectively ,While in case of common peroneal nerve (CPN), motor nerve conduction (MNCV) was normal in left leg, but however, there was decrease in motor nerve conduction in right leg, which may be the reason of muscle atrophy.***

Keyword: Muscle atrophy, Nerve conduction, Peroneal nerve and Tibial nerve

1. Introduction

The evaluation of patients suspected of having a neuropathy begins with a thorough history and clinical examination. This process leads to the elaboration of a clinical impression, based on symptoms, progression, family history, and examination findings. Nerve conduction studies (NCS) are used to assess peripheral nerve function. These procedures are performed to aid in the diagnosis of disease and injuries of the peripheral nervous system. It uses electrical stimuli to evoke responses from sensory or motor nerve fibers. It measures the speed of nerve conduction (nerve conduction velocity) and the size of the sensory and motor responses (amplitude of the response from muscles or nerves). These values are then compared with normative values of the laboratory. To find out of nerve disorders of the upper and lower extremity has become a highly specialized area and electro diagnostic approach has been used for evaluating patients with these disorders (Leffler et al .,2000).

2. Methodology

Nerve conduction study (NCS) was carried out in a quiet room of neurophysiology laboratory at a temperature of 26^0 to 30^0C by using Neuroperfect-2000.The nerves (Common peroneal, posterior tibial for motor and suralfor sensory) were stimulated sub-cutaneous along their course where they are relatively superficial. The skin resistance was reduced by rubbing with spirit swab; the active electrode was placed over muscle belly and reference electrode over tendon. The nerve conduction examination were done, by stimulating motor and sensory nerves at specific sites, The intensity of stimulus was increased gradually until the muscle action potential is viewed and recorded the time it takes for the stimulus to be sensed by the recording electrodes. E-1 is placed over the mid-portion of a muscle belly to record the distal motor latency (DML). The motor nerve action potential (MNAP) had been recorded at their respective places. The recording electrode was placed directly over the nerve to record the sensory nerve action potential (SNAP). The nerve conduction velocity (NCV) is calculated by measuring the distance between stimulation sites and then dividing by the latency difference.

3. Case Report

A 25 years old male working in a small shop, began complaining of weakness in his right lower limb, had normal upper limb (right and left) and one lower limb (left). Three years before of this symptom onset, both side of lower limb was normal. But as the time was passed on, he started feeling difficulty in walking and occasionally during walking, he used to get sudden jerk. Graduallywithout any pain, he started feeling of muscle weakness in his right leg.We observed clinically the bulk, tone and strength of muscle, it was normal in right and left upper limb. However there was decrease in bulk of muscle, muscle strength and increase in muscletone inright limb compare to left limb (Figure 1).Nerve conduction studies showed, sensory nerve conduction (SNCV) of median (right and left) and ulnar nerve(right and left) was normal in upper limb (Table 1& 2, Figure 1&2) and bilateral Posterior tibial nerve (right and left), suralnerve (right and left) was normal in lower limb . F-wave was normal in both lower and upper limb (Table 3).While in case of common peroneal nerve (CPN), motor nerve conduction (MNCV) was normal in left leg, but however, there was decrease in motor nerve conduction in right leg. (Table 2, Figure 2), which may be the reason of muscle atrophy observed in right leg. It is a rare case of one side peroneal muscular atrophy observed in individuals.

4. Discussion

A neuropathy is a disease of the nerve. In a distal polyneuropathy all of the nerves to the feet and hands (glove and stocking) may be affected. In the foot for example this could involve the common peroneal nerve (both superficial and deep branches) and the tibial nerve (medial and lateral plantar and calcaneal branches). The loss can be motor or sensory or both motor and sensory and myopathy affects specific muscles, usually proximal muscles which give weakness with no sensory loss. There was earlierreports of measurements of motor nerve conduction velocity in peroneal muscular atrophy in mostly both the lower limb (Gilliatt and Thomas, 1957; Christie 1961; Amick and Lemmi, 1963;Blom et al., 1964). But one side of lower limb muscular atrophy is rare in individuals. The initial

descriptions of peroneal muscular atrophy were made simultaneously by Tooth (1886). The disorder is generally considered to be characterized by the onset in childhood or adolescence of a symmetrical atrophic weakness of the small muscles of the feet and of the peroneal and anterior tibial muscle group. The calf muscles are not affected until later and involvement of muscles above the knee is usually limited to the distal third of the thigh. Sensation may be diminished or may not in a distal distribution. Some authors have accepted cases with severe distal sensory loss (Halliday and Whiting, 1909).

5. Conclusion

It is concluded from the present study that muscular atrophy as diagnosed clinically, is generally ambiguous. Limitation of this finding can be overcome by further diagnosis, which can be done by using needle electromyography (EMG). Insufficient observations are unable to find out exact cause about this possible diagnosis.

6. Acknowledgement

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7. Conflict of Interest

The author declared no conflict of interest.

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Figure legend

Figure 1. Muscle atrophy in right limb and normal left limb.
Figure 2. MNCV recording of common peroneal nerve.

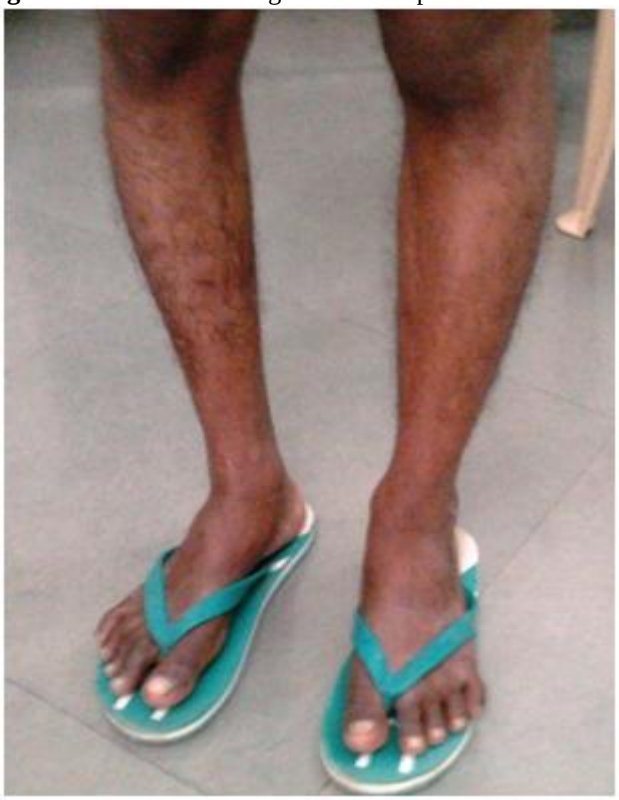

Figure 1

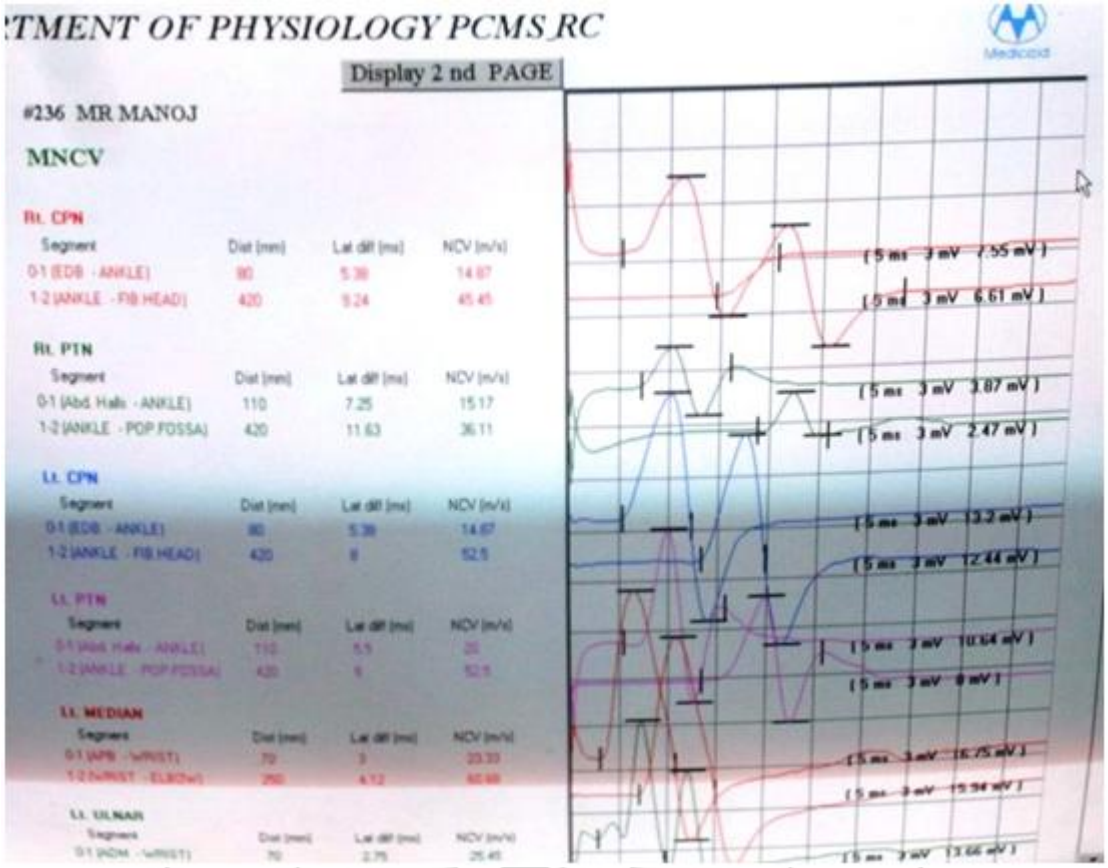

Figure 2

Table 1: MNCV (Upper and Lower limb)

NERVE	*Rec – Stim Site*	*Distance (mm)*	*Latency difference(ms)*	*NCV(m/s)*
Rt. CPN	EDB- ANKLE	80	5.38	14.87
	EDB-FIB.HEAD	420	9.24	45.45
Lt. CPN	EDB- ANKLE	80	4.88	15.25
	EDB-FIB.HEAD	430	8.00	53.75
Rt. PTN	Abd. Halls-ANKLE	110	7.25	15.17
	Abd. Halls- POP. FOSSA	420	11.63	36.11
Lt. PTN	Abd. Halls-ANKLE	100	5.50	20.00
	Abd. Halls- POP. FOSSA	430	8.00	53.75
Rt. Median	APB-WRIST	80	2.50	32.00
	APB-ELBOW	250	4.62	54.11
Lt. Median	APB-WRIST	70	3.00	23.33
	APB-ELBOW	240	4.12	58.25
Rt. ULNAR	ADM-WRIST	70	2.88	24.31
	ADM-ELBOW	250	4.87	51.33
Lt. ULNAR	ADM-WRIST	80	2.75	25.45
	ADM-ELBOW	240	4.63	54.00

Table 2: SNCV (Upper and Lower limb)

NERVE	*Rec – Stim Site*	*Distance (mm)*	*Latency difference (ms)*	*NCV (m/s)*
Rt. SURAL	Laterals Malls-MID CALF	170	2.75	61.82
Lt. SURAL	Laterals Malls-MID CALF	175	2.80	62.50
Rt. Median	2nd Digit -WRIST	130	1.80	72.22
Lt. Median	2nd Digit- WRIST	140	1.70	82.35
Rt. ULNAR	5th Digit - WRIST	130	1.75	74.29
Lt. ULNAR	5th Digit - WRIST	120	1.60	75.00

Table 3: F WAVE (Upper and Lower limb)

NERVE	Distance (mm)	Latency difference (ms)	Velocity (m/s)
Rt. CPN	90	25.13	6.2
Lt. CPN	80	24.25	6.6
Rt. PTN	110	25.50	8.63
Lt. PTN	100	22.26	8.12
Rt. Median	80	27.50	5.82
Lt. Median	70	24.63	5.68
Rt. ULNAR	70	29.50	4.75
Lt. ULNAR	80	25.63	6.24