

THE RELIABILITY OF F-WAVE IN LUMBOSACRAL RADICULOPATHY

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Introduction

Lumbosacral radiculopathy is a clinical disorder caused by impaired function (compression or irritation) of lumbosacral spinal nerve roots. It is manifested by low back pain radiating down into lower limbs in a dermatomal pattern, numbness, loss or decreased reflexes and also muscle weakness along myotomal pattern may be present. There is a wide range of etiologies of lumbosacral radiculopathy, the most common etiology is spondylodegenerative changes as lumbar disc herniation. For definitive diagnosis of lumbosacral radiculopathy, there are variable diagnostic modalities which include magnetic resonance imaging of lumbosacral spine and electrophysiological studies of lower limb nerves. F wave is one of the late responses which is used to study proximal nerve involvement, it is a low amplitude response produced by antidromic activation of motor neurons.

Results

Regarding neurological examination:

There were affected deep tendon reflexes in 69.9% of patients, hypothesia along lumbar 4,5 and sacral 1 dermatomes in 31.4% of patients, weakness of hip abductors in 17.2% of patients, hip extensors in 17.2% of patients, ankle dorsiflexors in 17% of cases, long toe extensors in 15.6% of patients, ankle plantar flexors in 17.1% of patients, and positive straight leg raising test in 54.3% with statistical significant differences between cases and controls regarding affected deep tendon reflexes, hypothesia along Lumbar 5 and Sacral 1 dermatomes, weakness of hip abductors, hip extensors, ankle dorsiflexors, long toe extensors, ankle plantar flexors and Straight leg raising test.

Regarding electrophysiological assessment:

There was statistically significant difference between 2 studied groups as regards the mean value of peroneal distal latency, peroneal amplitude, peroneal conduction velocity (1st and 2nd segments), H reflex latency, tibial F latency and peroneal F latency.

According to MRI findings of studied patients:

The most commonly affected root was S1 (61.4%) followed by L5 (60%).

There was statistical significant association between MRI findings and some clinical and electrophysiological parameters:

As affected knee reflex and ankle reflex, weakness of hip abductors, hip extensors, ankle dorsiflexors, weakness of long toe extensors, affected peroneal distal latency, amplitude and affected F wave latency and affected H reflex latency.

Table: value of different electrophysiological parameters of the two studied groups

	Cases (No=70)	Control (No=60)	Test of significant (P)
Tibial DL	4.13± 0.81	3.8± 0.74	(t= 1.8, P=.07)
Tibial amp	14± 6.02	15.3± 6.08	(t= -1.6, P=.24)
Tibial CV	45.5± 5.28	46.4± 2.6	(t= -1.6, P=.21)
Peroneal DL	4.9± 1	4.2± 0.68	(t= 4.6, P=.0001*)
Peroneal amp	5.8± 3.1	7.4± 2.8	(t=-2.9,P=.003*)
Peroneal CV(1 st segment)	46.2± 3.9	47.9± 3.5	(t= -2.6,P=.013*)
Peroneal CV(2 nd segment)	61.2± 13	66.8± 10.7	(t= -2.9 , P=.009*)
H reflex lat	32.5± 2.7	29.8± 1.8	(t= -6.7 , P<.0001*)
Tibial F lat	51.8± 8.3	47.47± 4.4	(t= -3.8 , P =.0002*)
Peroneal F lat	51.7± 5.8	47.63± 4.11	(t= -4.7 , P<.0001*)

Aim of the work

Our objective was to evaluate the diagnostic efficacy of F wave as an electro-diagnostic test and its reliability for diagnosing lumbosacral radiculopathy in clinically suspected patients.

Subjects and Methods

Thirty five patients (above 18 years old) presented with clinical manifestations of lumbosacral radiculopathy participated in this study. Another 30 healthy subjects were enrolled as a control group.

For each patient and healthy subject, the following was done:

- History taking.
- Complete neurological examination and SLRT.
- Motor nerve conduction study of posterior tibial and deep peroneal nerves, the measured parameters were distal motor latency in ms, peak to peak CMAP (compound muscle action potential) amplitude in mV and nerve conduction velocity in m/s.
- Sensory nerve conduction study of sural and superficial peroneal nerves to exclude peripheral neuropathy.
- F wave of tibial and peroneal nerves, the measured parameters were minimal F latency and F estimate in ms.
- H reflex was performed measuring predicted H value and H latency in ms.
- MRI of the lumbosacral spine was performed.

Conclusion

- F wave is an important method for diagnosis of radiculopathy and evaluation of the physiological state of the affected root because it reflects the status of proximal motor nerve conduction and excitability of motor neuron pool.
- MRI is important to evaluate structural causes of lumbosacral radiculopathy as lumbar disc herniation.
- Motor nerve conduction studies are nearly normal in lumbosacral radiculopathy except in severe cases when there is loss of 50% or more of motor axons.
- Sensory conduction studies are almost normal in lumbosacral radiculopathy.