– Abstract –

The Sensitivity of Electrodiagnostic Parameters in the Diagnosis of Diabetic Neuropathy

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Objectives : The purpose of this study was to determine the sensitivity of different electrodiagnostic parameters in the diagnosis of diabetic neuropathy.

Methods : Subjects consisted of 43 diabetic patients with a mean age of 61.3±9.6 years and an average duration of diagnosed illness of 8.4±6.5 years. Thirty-five healthy adult volunteers with mean age of 59.5±6.9 years were included as the control group. Nerve conduction study(NCS) consisted of median, ulnar, peroneal, tibial motor responses and their respective F-responses; median, ulnar, superficial peroneal, deep peroneal, sural, lateral dorsal cutaneous branch of the sural nerve and medial plantar sensory responses; and H-reflex recorded from the gastrocsoleus muscle. All sensory nerve conduction studies were performed antidromically with surface electrodes. The frequency of abnormal parameters in the diabetic patients was obtained by comparison with the reference values obtained from the control group.

Results : The most frequent abnormal electrodiagnostic parameter was the H-reflex latency(63.0%) followed by the minimal F-latency of the peroneal nerve(60.5%), medial plantar sensory nerve onset latency(55.8%) and the superficial peroneal SNAP amplitude(51.2%).

Conclusion : The H-reflex, F-wave and medial plantar sensory nerve latency may be useful parameters in the early diagnosis of diabetic neuropathy. However, the diagnosis of diabetic neuropathy should be based on the combination of both clinical and electrodiagnostic findings.

Key Words : Diabetic neuropathy, Frequency, Nerve conduction parameter, H-reflex

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,[3-10] F-   [4,11]   H-   [2,11,13,14]

F-   H-   .

,   (CMAP)   (SNAP)   , F-
                                        H-   .

                                            34   ,   32

                                        ,   3cm

                        8cm,
                    10cm   ,
                    14cm   .[14]

                    95%   z-
                    .[15]

1.
                        : 1)   =   +1.64× SD; 2)   =   -1.64
1999   1   7   × SD.

                        43 (16 ,   27)
            .   61.3± 9.6   (40 ~86)
                            8.4   (0~25)   .
                35 (10 ,   25)
,   59.5± 6.9   (50 ~74)   (n=35)
                (Table 1).   ,   ,   4.0ms,
                                        6.3mV,   52.2m/s;
2.   4.5ms,   1.8mV,   40.7m/s   ,
                                        F-   ,   ,
                    ,   28.4ms, 28.6ms, 50.4ms, 49.7ms   (Table 2).
F-   H-   . Dantec   Counter-
point MK2   2.8ms,   18.2μV,   49.6m/s
    0.2msec   square wave pulse   ,   3,0ms,   6.9μV,
    20~2000Hz,   1msec/division,   10μ
V/division   **Table 1.** Characteristics of Subjects
2~10000Hz,   2msec/division,   2mV/divi-
sion   .   ,   ,   ,

	Patient group	Control group
Number	43	35
Sex(M:F)	16:27	10:25
Mean age(years)	61.3±9.6(40~80)	59.5±6.9(50~74)
DM duration(years)	8.4±6.5(0~25)	

            ,   ,   ,   ,   ,   ,
                    (lateral cutaneous branch of
sural nerve)   ,

Table 2. Reference Values for the Motor Nerve Conduction Parameters and Minimal F-wave Latency (n=35)

Nerve	Latency(ms)	Amplitude(mV)	NCV[1](m/s)	F-latency(ms)
Median	4.0	4.4	52.2	28.4
Ulnar	3.3	6.3	55.6	28.6
Peroneal	4.5	1.8	40.7	50.4
Tibial	4.8	6.5	39.7	49.7

Values = mean±1.64× SD

1. NCV : nerve conduction velocity

Table 3. Reference Values for the Sensory Nerve Conduction Parameters and H-reflex Latency (n=35)

Nerve	Latency(ms)	Amplitude(μV)	NCV[1](m/s)
Median	3.0	20.3	48.9
Ulnar	2.8	18.2	49.6
Superficial peroneal	3.0	3.7	44.2
Deep peroneal	2.6	1.2	31.8
Sural	3.0	6.9	46.0
Distal sural	3.1	2.2	31.4
Medial plantar	2.4	4.6	41.0
H-reflex	32.2		

Values = mean±1.64× SD

1. NCV : nerve conduction velocity

46.0m/s   2.4ms,
4.6μV   (Table 3). H-
32.2ms   .
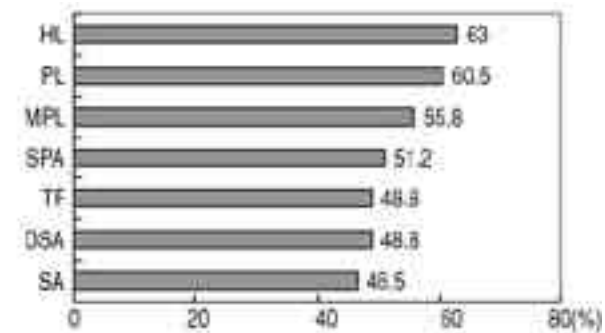
H-   63.1%   ,
F-   (60.5%),   (55.8%),
   (46.5%)   (Fig. 1).
43   14   (32.6%)

, 7   (16.3%)

.[7]

Fig. 1. Frequency of abnormal nerve conduction parameters in diabetic patients (n=43).

50%[8]

.

.

36.4%~84%

.[3,5,6,9] Burke   [5]

Brad-
dom   [3]   84%

.

52.7%~70%

Celiker   [6]   ,   ,
(52.7%),

,

(36.4%)   , Felsenthal   [9]

Braddom   [3]   70%
61%

.

Felsenthal   50%
      Celiker   Braddom

. Dyck   [7]   Rochester diabetic study

.   .

48.8%

.

72.1%,   SNAP

60.5%, 58.1% ,

.

,

[11] . Izzo [10]

.

(51.2%) (48.8%)
(46.5%) ,

. F- H-

55.8%

[16]

H- F- (late
response)

. ,

.

[8]

46.5% .

.

F- H-

. H-

[2,11]
Wager [13] H-
(linear relationship) ,

H-
. H-
32.3ms
63.3% H-
.

H-
,
H-
12 . F-
Andersen Stalberg [11]
F-
F- Z-score
F-
. H-
F- , F-
F-
.

,

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