

– Abstract –

## Segmental Demyelination in Diabetic Neuropathy

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**Objectives** : Conduction block is an electrophysiological hallmark of segmental demyelination. If segmental demyelination was a prominent part of the pathology of diabetic neuropathy, then conduction block should be common in patients with diabetic neuropathy. The purpose of this study is to assess the degree of conduction block and relationship between conduction block and clinical features in diabetic patients.

**Methods** : We performed median, ulnar, and deep peroneal motor nerve conduction studies in 31 normal adults and 36 patients with diabetic neuropathy. We measured amplitude decay, area decay, and temporal dispersion of compound muscle action potentials. In normal subjects, the upper normal limits (mean+2SD) of amplitude decay, area decay, and temporal dispersion of compound muscle action potentials were calculated. In the patients group, beyond the upper normal limit of amplitude decay or area decay without increase of upper normal limit of temporal dispersion was considered as conduction block. In case amplitude or area decay were greater than 30%, we considered them as conduction block although temporal dispersion went beyond upper normal limit in this study.

**Results** : In diabetic patients, a total of 208 nerve segments was evaluated. The criteria for conduction block were met in only 17 (8.2%) nerve segments in 10 patients. In the 17 nerve segments with conduction block, the mean amplitude decay was 28.6% and the mean area decay was 26.1%. Statistically, the clinical features of the patients showed no significant difference according to the presence of conduction block in terms of duration of disease, blood glucose level, and HbA1c.

**Conclusion** : With the criteria of conduction block as described above, conduction block was uncommon in diabetic neuropathy. In addition, the presence of conduction block was not related to the severity of clinical features in diabetic patients.

**Key Words** : Diabetic neuropathy, Segmental demyelination, Conduction block

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2)

가

가  
가  
(diabetic neuropathy)

(entrapment neuropathy)

36 ( 16 , 20 ) 25

74

1 , 35

93%

가

가

(symmetric sensorimotor polyneuropathy) 23 ,  
(symmetric sensory polyneuropathy) 11 , (mononeuropathy multiplex) 2

(segmental demyelination)

2.

(conduction block)

Premiere plus(Medelec Ltd., Woking,

(abnormal temporal dispersion)

United Kingdom)

3 Hz 10 KHz

(sweep

speed) 5 msec/division,

(sensitivity) 5

mV/division

Liveson Ma<sup>7</sup>

6

(peak to peak amplitude),

(negative peak area)

(negative peak duration)

(Fig. 1).

가

Weber<sup>8</sup>가

1.

1)

(amplitude decay),  
(dispersion)

(area decay),  
(Fig. 2).

(amplitude decay),  
(temporal

31 ( 18 , 13 )



**Table 1.** Physiologic Conduction Block and Temporal Dispersion in Normal Subjects

	Median nerve(n=33)	Ulnar nerve(n=32)	Peroneal nerve(n=32)
Amplitude decay(%)	9.5±4.9(19.3) <sup>1</sup>	7.8±4.0(15.8) <sup>1</sup>	10.1±4.9(19.9) <sup>1</sup>
Area decay(%)	6.5±4.7(15.9) <sup>1</sup>	4.7±4.5(13.7) <sup>1</sup>	5.3±3.6(12.5) <sup>1</sup>
Temporal Dispersion(%)	6.3±4.1(14.5) <sup>1</sup>	5.9±4.3(14.5) <sup>1</sup>	5.2±3.7(12.6) <sup>1</sup>

Values are mean±SD, 1 : mean±2SD, upper normal limit

**Table 2.** Age and Sex Distribution of Patients

Age(years)	Male	Female	Total
20~29	0	1	1
30~39	2	1	3
40~49	4	5	9
50~59	3	2	5
60~69	5	7	12
70~79	2	4	6
Total	16	20	36

**Table 4.** Duration of Diabetes in Patients

Duration of diabetes(years)	No. of cases
<1	1
1~5	19
6~10	9
11~15	3
16~20	3
21~	1
Total	36

**Table 3.** Clinical Characteristics of Patients with DM

Age(years)	55.3±12.8
Duration of disease(years)	7.3±5.8
Fasting blood glucose(mg/dL)	201.9±74.5
2 hour postprandial blood glucose(mg/dL)	269.9±62.0
HbA1c(%)	11.9±3.9

Values are mean±SD.

**Table 5.** Distribution of Nerves with Conduction Block in the Patients with Diabetic Neuropathy

Nerves	No. of cases(%)
Median nerve	3/71(4.23)
Ulnar nerve	6/72(8.33)
Deep peroneal nerve	8/65(12.31)
Total	17/208(8.17)

(Table 6).

6.

5.

36, 71, 72, 65, 208, 3, 6, 8, 17, 17, 26.1%, 30%, 3, 10, 6, 2, 2, 1, 3, 4, 1, 2

7.

(Table 7).

(p<0.05)

(p<0.05)

(Table 8).

HbA1c

(Table 9).

가  
 3  
 5,9  
 (mye-  
 Guillain-Barre  
 6  
 2,10  
 linated nerve fiber)  
 (unmyelinated nerve fiber)  
 (remyelination)

**Table 6.** Numbers of Nerves with CB<sup>1</sup> in each Patient

No. of nerves with CB <sup>1</sup>	No. of cases
1	6
2	2
3	1
4	1
Total	10

1. CB : Conduction Block

**Table 7.** The Latency of Motor Nerve Conduction Study in Diabetic Neuropathy According to the Presence of Conduction Block

Nerves	Latency(msec)	
	Patients with CB <sup>1</sup>	Patients without CB <sup>1</sup>
Median nerve	6.3±2.3	4.3±1.2
Ulnar nerve	4.0±1.5	3.0±0.6
Deep peroneal nerve	6.1±0.7	5.0±0.7*

Values are mean±SD.

1. CB : Conduction Block

\* : p<0.05

40%  
 9 Brown Feasby  
 20%  
 11 Olney  
 14%  
 12 1990 Rhee  
 'interphase cancellation'  
 50%  
 20%

**Table 8.** The Conduction Velocity of Motor Nerve Conduction Study in Diabetic Neuropathy According to the Presence of CB<sup>1</sup>

Nerves	Conduction velocity(m/sec)	
	Patients with CB <sup>1</sup>	Patients without CB <sup>1</sup>
Median nerve	33.1±21.5	49.8±6.7
Ulnar nerve	43.1±12.7	52.8±7.3*
Deep peroneal nerve	38.5±5.0	40.5±5.1

Values are mean±SD.

1. CB : Conduction Block

\* : p<0.05

**Table 9.** Clinical Characteristics in Diabetic Patients According to the Presence of CB<sup>1</sup>

	Patients with CB <sup>1</sup> (n=10)	Patients without CB <sup>1</sup> (n=26)
Age(years)	58.0±10.6	54.3±13.6
Duration of disease(years)	6.8±5.4	7.5±6.0
Fasting blood glucose(mg/dL)	226.8±82.1	192.4±70.7
2 hour postprandial blood glucose(mg/dL)	301.7±60.6	257.7±59.1
HbA1c(%)	12.4±4.2	11.7±3.8

Values are mean±SD, 1. CB : Conduction Block

13 가 가

30% Brown Feasby<sup>11</sup> Weber<sup>6</sup> 가 3가

15%

Oh Abu-Shakra 가

가

(popliteal fossa) 가 208 36 10 17

(technical error)가 (8.17%).

(negative peak amplitude) 2 10 6 1 4

가 , 2 , 3 1

(total area) 가 6 1 2

(total duration) , 2 HbA1c

3

19.3, 15.8, 19.9%

15.9, 13.7, 12.7%

14.5,

14.5, 12.6%

20% interphase cancellation 31 36

15%

15%

Brown Feasby<sup>11</sup> 1. 71

14% 72 , 65 208

Olney<sup>12</sup> 15.8% , 8 3 , 6

17 (8.2%)

2. 17  
28.6%  
26.1%

3.

4. HbA1c

neuropathy. *Muscle Nerve* 1991; 14: 858-862

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