

신경근육재활 및 전기진단

발표일시 및 장소 : 10 월 27 일(토) 14:20-14:30 Room D(5F)

OP3-3-3

Early detection of diabetic neuropathy using paired stimulation studies of the sensory nerves

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Introduction.

The relative refractory period (RRP) is known as a sensitive parameter for detecting early subtle changes in peripheral polyneuropathies. This study seeks to use the RRP as an aid for early detection of diabetic polyneuropathy (DPN) patients.

Methods.

Routine nerve conduction studies were performed, and the RRP of the median and sural sensory nerves were measured in 63 diabetic patients and 22 healthy control subjects. The shortest inter-stimulus interval, where the latency of the response to the second stimulus recovers to normal, was defined as the RRP (Figure 1). The severity of DPN was rated as 1 (suspected), 2 (probable), and 3 (definite) according to electrophysiologic parameters. Clinical symptoms and signs of DPN were also assessed using the Neuropathy Symptoms Score (NSC) and the Neuropathy Impairment Score (NIS).

Results.

The RRP of the median and sural nerves were significantly longer in diabetic patients (3.6 ± 0.6 msec and 3.8 ± 0.8 ms, respectively) than in the control group (2.9 ± 0.3 msec and 3.0 ± 0.4 ms, respectively). RRP values of both nerves (3.6 ± 0.6 msec and 3.6 ± 0.6 ms, respectively) were also significantly prolonged than the control group, even in diabetic patients without DPN based on conventional conduction studies (Table 1). Additionally, the RRP of the sural nerve was found to be positively correlated ($r=0.427$, $p=0.001$) with the severity of the DPN (Figure 2), and also with the NIS ($r=0.292$, $p=0.022$).

Conclusions.

The RRP, in contrast to the control group, was prolonged in diabetic patients even before other electrophysiologic abnormalities appeared. The RRP of the sural nerve delays even further as the electrophysiologic and clinical severity of the DPN increases. Our Results suggest that the RRP can be a possible early indicator of DPN.

Table 1. The Relative Refractory Periods of the Median and Sural Nerves in Each Group

| | Control | DM | DM without DPN |
|--------------|-----------|-------------|----------------|
| Median nerve | 2.9 ± 0.3 | 3.6 ± 0.6 * | 3.6 ± 0.6 * |
| Sural nerve | 3.0 ± 0.4 | 3.8 ± 0.8 * | 3.6 ± 0.6 * |

Abbreviations: RRP, relative refractory period (msec); DM, diabetes mellitus; DPN, diabetic polyneuropathy

Data are mean ± standard deviation.

* P < 0.05 compared to control group.

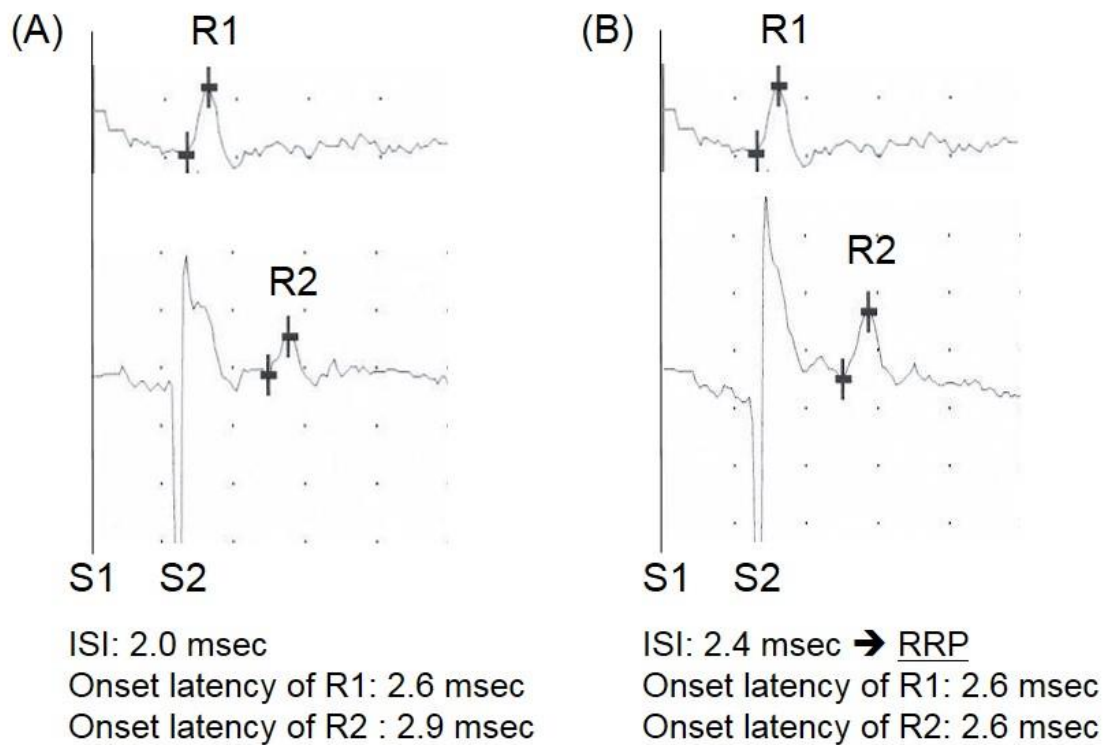


Figure 1. Method of measuring the relative refractory period (RRP). The RRP is defined as the shortest inter-stimulus interval (ISI, S2-S1) where the onset latency of R2 equals that of R1, depicted in (B).

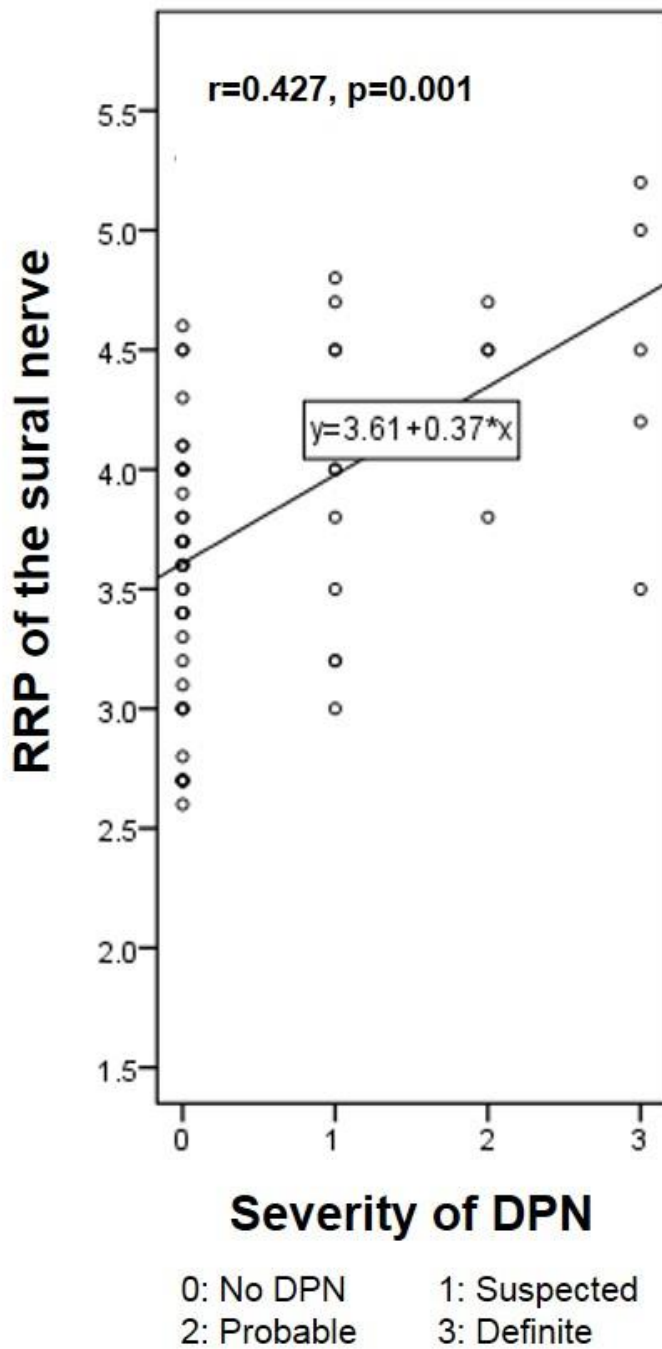


Figure 2. Scatter plot and Spearman's correlation coefficient (r) of severity of DPN versus RRP of the sural nerve. RRP, relative refractory period; DPN, diabetic polyneuropathy.