

原著

Results of Psychological Tests on Subjects of the Same Age at the Same Business Entity (Report 2)

—Vegetative dystonia and coefficient of
variation of the R-R intervals on ECG—

Yohko KITAMURA^{*,**}
and Taisaku KATSURA^{**}

Abstract

This study examined the R-R intervals on ECG in 428 male subjects during a rest interval. After the R-R intervals of 100 sequential counts has been recorded, the mean values, standard deviation (SD), ratio between maximum and minimum, and coefficient of variation (CV) were calculated. The CMI was used to separate the subjects into groups according to the Fukamachi method and the Abe method. The results for these statistics indicated that the total of Regions I and II amounted to 380 cases with a CV of 4.37%, while the total of Regions III and IV amounted to 48 cases with a CV of 6.18%. The mean CV value for the entire group was 4.49%. The data shows that those subjects who were classified within Regions III and IV, that is, those subjects who

displayed a predisposition towards neurosis, maintained a significantly higher CV percentage. On the other hand, CV was slightly low in the psychosomatic type of vegetative dystonia.

Key words: R-R interval, vegetative dystonia, coefficient of variation

Quantitative rating of vegetative dystonia has been attempted in recent years using variations in the R-R intervals on ECG. In the present study, the R-R intervals of 428 male subjects aged 56 to 57 years were determined. These subjects has visited a hospital for medical examination of adult diseases between September 1983 and March 1984. The present paper outlines and discusses the results obtained.

Subjects and Methods

The circumstances of the 428 male subjects were such that their daily lives and working conditions indicated a healthy environment. The R-R intervals on the ECG of these subjects were examined as follows. During the pro-

*Internal Medicine of Metropolitan Police Hospital Tama Branch

**First Department of Internal Medicine, Nihon University School of Medicine

cedure, each subject was requested to rest for 10 to 15 min. Their ECG in the resting time was recorded and the R-R intervals of 100 sequential counts were recorded using Autonomic, Medical Electronics Commercial Co., Ltd. Following this, the mean values, SD, ratio between the maximum and minimum, and coefficient of variation (CV) were calculated. CV can be obtained by dividing the standard deviation by the mean value and then multiplying the quotient by 100 to obtain a percentage (Table 1). In addition, assessments of the CMI⁽¹⁾⁻⁵⁾ were performed in these subjects, and the results for CV were evaluated comparatively by dividing the subjects into a so-called normal group and so-called abnormal group on the basis of the CMI.

Results

For analysis of the CMI, the subjects were classified according to the Fukamachi method^(6,7) and the Abe method⁽⁸⁾⁻¹⁰⁾. In Japan, the Fukamachi method is very popular as a

Table 1

$$CV = \frac{\text{standard deviation}}{\text{mean value}} \times 100$$

CV: coefficient of variation

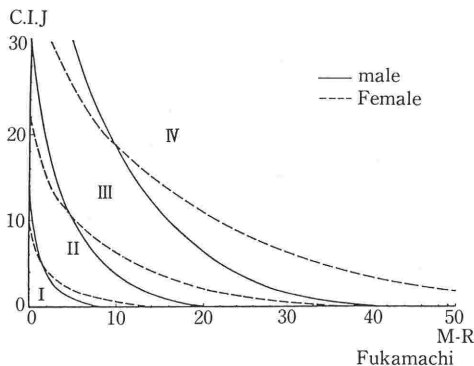


Fig. 1 Discriminative Chart
 I: Diagnosed to be normal, II: Provisionally diagnosed to be normal, III: Provisionally diagnosed to be neurotic, IV: Diagnosed to be neurosis

diagnostic criterion of neurosis. In this method, a discrimination chart is used for making judgements, examining the numbers of "yes" replies for the CMI sections M to R, which indicate mental subjective symptoms. These data are plotted on the horizontal axis, while the number of "yes" replies for the CIJ is plotted on the vertical axis (Fig. 1). In applying the Abe method, the same plots as in the Fukamachi method are employed for the horizontal axis, but on the vertical axis, the number of "yes" answers for CMI questions especially chosen for their close relationship to the functions of the autonomic nerves is plotted (Fig. 2). As demonstrated on the graph, four

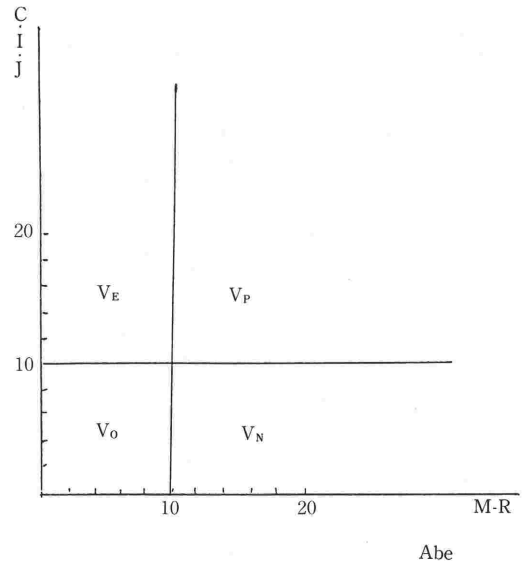


Fig. 2 Discriminative Chart
 V_O : Diagnosed to be normal
 V_E : Essential type
 V_N : Neurotic type
 V_P : Psychosomatic type
 } Vegetative Dystonia

Table 2 Distribution of CMI and Each CV_{R-R}

Region	Number (%)		CV _{R-R} %	
I	259 (60.5)	380 (88.8)	4.24	4.37
II	121 (28.3)		4.64	
III	39 (9.1)	48 (11.2)	6.75	6.18
IV	9 (2.1)		3.67	
Total	428 (100)		4.49	

regions were located: the normal region, the region of essential type, the region of psychosomatic type, and the region of neurotic type. By determining in which of these regions the crossing point of the horizontal axis with the vertical axis of the tested subject fell, the results for all tested subjects were classified. Summarized data for the CMI and CV according to the Fukamachi method are giving in table 2. Those individuals who fell in Region I amounted to 259 cases, the mean CV being 4.24%. Region II contained 121 cases, the mean CV being 4.64%. The total for Regions I and II amounted to 380 cases and the CV was 4.37%. Region III amounted to 39 cases, the mean CV being 6.75%. In Region IV, there were 9 cases, and the mean CV was 3.67%. The total for Regions III and IV amounted to 48 cases and the CV was 6.18%.

Table 3 Distribution of CMI and Each CV_{R-R}

Type	Number (%)	CV _{R-R} %
Normal	337 (78.7)	4.29
Essential	30 (7.0)	4.21
Neurotic	41 (9.6)	6.67
PSD	20 (4.7)	3.89
Total	428 (100)	4.49

Table 3 shows the distribution of CMI and each CV according to the Abe method. The normal type amounted to 337 cases, and the mean CV was 4.29%. The essential type included 30 cases and the CV was 4.21%. The neurotic type consisted of 41 cases and the CV was 6.66%. The psychosomatic type consisted of 20 cases and the CV was 3.89%.

Discussion

Since the first report by Wheeler and Watkins¹¹⁾ in 1973 quantification of diabetic autonomic neuropathy involving vegetative dystonia has been attempted using testing methods based on variations in the R-R intervals on ECG. Kageyama et al.¹²⁾¹³⁾ reported that there were some variations with age in the

coefficient of variation (CV) of the R-R intervals on ECG in healthy and normal subjects, and that lower counts were observed in younger subjects than in older subjects. In the present study subjects comprising same-aged men could be checked for determination of their CV values in parallel with their physical checks: 428 subjects were diagnosed in total.

The results of our CV determinations on these individuals were evaluated comparatively along with an analysis of the results for CMI. The subjects were all male. CMI was performed for simultaneous comparison with CV determination. The mean CV value for all subjects was 4.49%. The results of CMI were analyzed in relation to the predisposition to neurosis by the Fukamachi method and in relation to the predisposition to vegetative dystonia by the Abe method. The mean CV value was 4.37% in 380 subjects considered to be normal or in Regions I and II by the Fukamachi method, and 6.18% in the remaining 48 considered to show a predisposition to neurosis or to be in Regions III and IV by the same method. On the other hand, 337 subjects were considered to be of the normal type, 30 of the essential type, 41 of the neurotic type, and 20 of the psychosomatic type by the Abe method. The mean CV value in these groups 4.29, 4.21, 6.66, and 3.89%, respectively. The CV value was thus higher in the group with a predisposition to neurosis, suggesting participation of tension of the sympathetic nervous system. The mean CV value in the group with a predisposition towards psychosomatic disorders was as low as 3.89%, which was significantly lower than that in the normal group.

The present data were obtained by estimating the CV values in 428 subjects of the same sex and of the same age group with the object of quantifying vegetative dystonia. Furthermore, it is planned to compare the subjects in this group with those of different age groups in order to assess the situation at different time

points.

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