

이형(異形) 협심증 환자에서의 일중 심박동수 변이의 분석을 통한 자율신경계의 평가

가

정해익 · 승기배 · 임효영 · 강동현 · 장기욱 · 채장성 · 김재형 · 홍순조 · 최규보

Assessment of Autonomic Nervous System by the Analysis of Heart Rate Variability in Patients with Variant Angina

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ABSTRACT

Background and Objectives : Autonomic nervous discharge had been implicated in the pathogenesis of coronary artery spasm although the precise mechanisms by which coronary spasm is triggered remain to be elucidated. The purpose of this study was to assess the pattern of the autonomic nervous system in patients with variant angina through the analysis of heart rate variability. **Materials and Methods :** We compared the pattern of cardiac sympathetic and parasympathetic activity through the time domain and frequency domain analysis of heart rate variability with 24-hour Holter monitoring between 14 patients with variant angina and 14 healthy control subjects. None of the patients had organic coronary artery stenosis as determined by angiography. **Results :** 1) Among the time domain indices, the percent of successive normal NN intervals difference greater than 50 msec (pNN50) and the square root of the mean squared differences of successive NN intervals (rMSSD) in the patient group were significantly lower than those in the normal control ($p < 0.05$, respectively). 2) In the patient group, mean R-R intervals were significantly shortened from night to early morning compared to control group ($p < 0.05$). 3) With frequency domain analysis, low frequency (0.04 to 0.15 Hz) spectrum, which is correlated with sympathetic activity, was revealed no significant difference between two groups. From night to early morning, significant increase of high frequency (0.15 to 0.4 Hz) spectrum, which is specific index for vagal activity, and significant decrease of the ratio of low to high frequency, which represents sympatho-vagal interaction, was blunted in the patient group ($p < 0.05$). **Conclusions :** In variant angina, cardiac vagal influence on the heart rate was blunted and sympathetic activity was predominant at night and in the early morning. (Korean Circulation J 1999;29(6):590-595)

KEY WORDS : Variant angina · Heart rate variability · Autonomic nervous system.

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14

서 론

(異形) (epicardial co -

ronary artery)

ST

가

vagal interaction)

rate variability)가

domain)

(vagal nerve) 가

pNN50

(ratio)

(heart rate variability)

가

대 상

환 자

1998 4 9 가

14

criteria)

10

3

24

, 4) 24

가

(symapatho -

, 3) 24

(heart

24시간 생활심전도

(time 3 - channel Del Mar Avionics (459, 461,

domain) (frequency domain) 485) 24 ,

가 , 5) Del Mar Avionics (363 st -

가 ratascan) (artifact)

RR

(vagal nerve) 가 ,

rMSSD, 5% (artifact)

pNN50 , 7)8)

(0.04 0.15 Hz)

RR 120%

(0.15 0.4 Hz) 80% RR

Del Mar Avionics

fast - Fourier transform(FTT)

7)8)

가

(heart rate variability)

가

분석 방법

24

mean RR (mean of all coupling in -

tervals between normal beats ; RR

), SDNN(standard deviation of all normal

R - R intervals over 24 hours ; 24 RR
(), SDANN(standard deviation
of average NN intervals in all 5 minutes segments
of the entire recording ; 5
RR 288 RR
(), pNN50(percent of differences between
adjacent normal RR intervals more than 50 ms
during 24 hours ; RR 가
50 msec), rMSSD(square root of
the mean squared differences of successive NN
intervals ; RR
) 24 RR
interval . pNN50,
rMSSD
()
21 31 22 30 22 , 22
6 5
(low frequency power spectrum) 0.04 0.15
Hz , (high frequency power
spectrum) 0.15 0.4 Hz
(power
spectral density)(; msec 2)
(low to high frequency ratio)

5)6) SPSS
two - tailed t -
RR
(repeat
measured) ANOVA
. p 0.05
결 과

(Table 1). 24 pNN50
10.17 ± 9.59 msec,
3.91 ± 3.88 msec (p<0.05)
, rMSSD 32.59 ± 12.89 msec,
23.39 ± 5.88 msec

Table 1. Comparisons of the clinical characteristics

	Control (n = 14)	Patients (n = 14)
Age (mean ± SD)	51.9 ± 10.9	54.6 ± 8.8
Male sex (%)	21.4	57.1
Hypertension (%)	21.4	35.7
Diabetes mellitus (%)	14.3	21.4
Smoking (%)	28.6	35.7
Hypercholesterolemia* (%)	14.3	7.1
EF (mean, %)	68.5	63.1

*Total cholesterol over 220 mg/dl, EF : ejection fraction
p>0.05 each other

Table 2. Comparisons of time domain variables

	Control (n = 14)	Patients (n = 14)
Mean RP interval (msec)	858.57 ± 99.23	784.43 ± 72.11
pNN50 (%)	10.17 ± 9.59	3.91 ± 3.88*
RMSSD (ms)	32.59 ± 12.89	23.39 ± 5.88*
SDNN (ms)	121.62 ± 20.92	114.86 ± 28.81
SDANN (ms)	110.57 ± 22.44	100.79 ± 30.00

Each value is expressed as mean ± SD
pNN50 : percent of difference between adjacent
normal RP intervals more than 50 ms during 24 hour,
RMSSD : square root of the mean squared differences
of successive NN intervals, SDNN : standard deviation
of all normal RR intervals over 24 hours, SDANN : stan-
dard deviation of average NN intervals in all 5 minutes
segments of the entire recording, *p<0.05 vs control

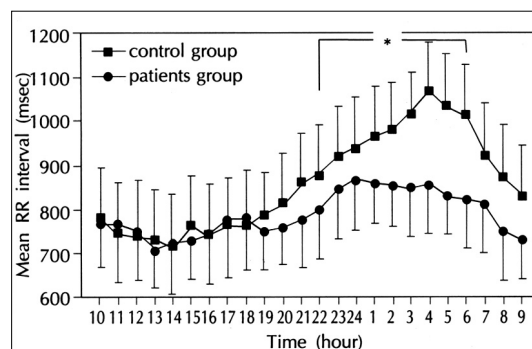


Fig. 1. Comparison of the time course of mean RR interval. Each value is expressed as mean ± SD.
* : p<0.05 vs control group.

($p < 0.05$)
SDNN, SDANN
(Table 2). RR

RR
RR

RR
6
(Fig. 1).

22
($p < 0.05$)

(Fig. 2),

가

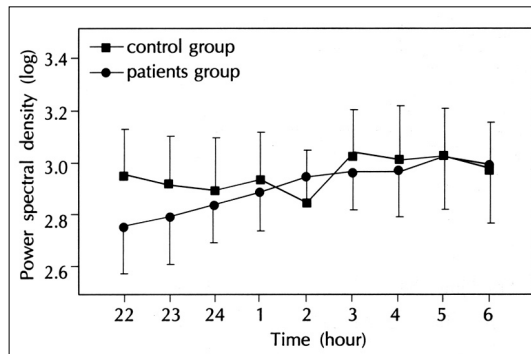


Fig. 2. Comparison of the time course of low frequency spectrum. Each value is expressed as mean \pm SD. No significant differences between two groups.

01 04
($p < 0.05$)

(Fig. 3).

06

(Fig. 4).

01
($p < 0.05$)

고 안

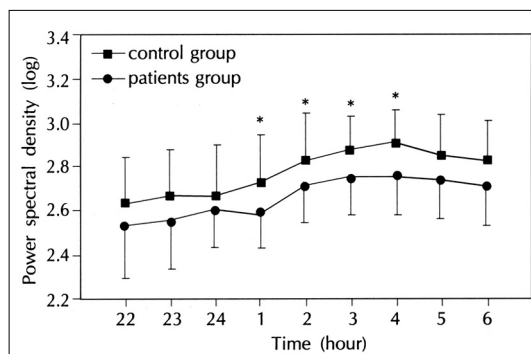


Fig. 3. Comparison of the time course of high frequency spectrum. Each value is expressed as mean \pm SD.
*: $p < 0.05$ vs control group.

가
가
(7)8)

(tone)

1)

9)

가 10)

가
(vagomimetic drug)

11)

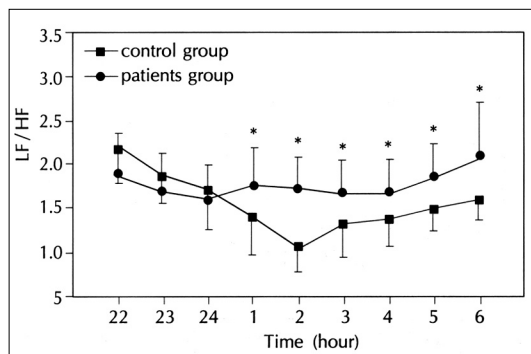


Fig. 4. Comparison of the time course of the ratio of low to high frequency spectrum. Each value is expressed as mean \pm SD. LF : low frequency, HF : high frequency.
*: $p < 0.05$ vs control group.

eye movement)
가
(REM ; rapid

가
(adrenergic receptors)
가 가 가
12)
(EDRF)

가
가
가

13) 요 약

연구목적 :

가 24

14)

가

pNN50 rMSSD가

방 법 :

24 RR

24
(heart rate varia-

RR 가
RR

bility)

가 ,

결 과 :

1) pNN50(percent of di-
fferences between adjacent normal RR intervals
more than 50 ms during 24 hours ;

RR 가 50 msec)
rMSSD(square root of the mean squared differences
of successive NN intervals ; RR

가 (ratio)
가

)가

(p 0.032 0.022).

2) RR

가

가 (p 0.05).

3)

(nocturnal angina)

24

가가

가 (p

0.05).

결 론 :

중심 단어 :

가

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