

고혈압을 처음 진단 받은 환자에서 좌심실 비대 및 심실기능과 24시간 활동 혈압과의 관계에 대한 연구*

이기현 · 신길자 · 조홍근

= Abstract =

The Correlation between LVH, LV Function and 24-hour Ambulatory Blood Pressure Monitoring in Patients with Newly Diagnosed Hypertension

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Background : Left ventricular hypertrophy is one of the major cardiovascular risk factors. So it is generally thought to be a predictor of complication and prognosis of hypertension. The 24-hour noninvasive ambulatory blood pressure monitoring(ABP) has been shown to be superior to office BP in predicting target organ involvement in patients with hypertension and assessing antihypertensive therapy. To determine the correlation between blood pressure and left ventricular hypertrophy in patients with newly diagnosed systemic hypertension, we evaluate blood pressure by 24-hour ABP, office BP and echocardiographic parameters of left ventricular hypertrophy.

Methods : From January 1995 to September 1995, in 22 patients with untreated essential hypertension who were diagnosed recently(within 1 month). They were studied by 24-hour noninvasive ambulatory blood pressure monitoring and cross sectional, M-mode and pulsed Doppler echocardiography for examining the relation between ABP and echocardiographic parameters. In the present study, we divided the patients by two groups ; white-coat hypertensive group and sustained hypertensive group.

Results :

1) Among the 22 patients who were diagnosed by office blood pressure, the white-coat hypertension was in 7 cases(31.8%) and sustained hypertension was 15 cases(68.2%).

2) In sustained hypertensive group, LV mass, LV mass index and relative posterior septal wall thickness were significantly increased compared with white-coat hypertensive group.

3) 24-hour ABP and systolic BP and loading % were significantly correlated with relative posterior septal wall thickness($p < 0.05$).

Conclusion : In patients with newly diagnosed hypertension(especially with sustained hyper-

KEY WORDS : 24-hour ambulatory blood pressure monitoring · LVH · Hypertension.

140/90mmHg

, 1

Q 가

BMI가 35

, 24

22

10

12, 55 ± 12.2.

가

1) 24시간 활동 혈압 측정

24

Circadian mode BP3

2cm

cuff

30

blood pressure data analysis
BP III) .

2 4

가

6

10

10

6

24

4)

2.5mmHg , 24

135/85

24

mmHg

(sustained

hypertensive group) , 135/85mmHg

(white - coat hypertensive group)

5)

(loading % of BP)

140mmHg

90mmHg

가

가

24

1. 연구대상

1995 1 9

(%)

25)

- (%) =
[(systolic BP>140mmHg or diastolic BP>90mm Hg)/total number of readings in 24 - hours] × 100

2) 심초음파 검사

Hewlett - Packard SONOS
1000 M , , 15
30 ° 2.5MHz
M
De -
vereux

- (gm)
= 1.04 × [(IVST + LVID + PWT)³ - (LVID)³] ×
0.8 + 0.6
IVST : interventricular septal thickness mea -
sured at end - diastole.
LVID : left ventricular internal dimension
PWT : posterior wall thickness

(ejection
fraction : EF), fraction shortening(FS)

- (relative wall thick -
ness ; RWT)
= 2 × (
/)
(%)⁶⁾
= [\{ ()²
- ()² \ }
/ ()²] × 100
• Fractional shortening(%)
= [(-) /
] × 100

OT)

velocity integral(TVI)

- (cardiac output ; CO)
= (stroke volume ; SV)
× (heart rate ; HR)

(peak E velocity)
(peak A velocity) , E/A ratio
E velocity A velocity
(mitral valve deceleration
time ; MVDt) E
(isovolumetric relaxation time ; IVRT)
A2

3) 통 계

SPSS pc⁺ (version 3.0) pac -
kage
oneway ANOVA
(simple linear reg -
ression) , p 0.05

결 과

1. 일반 특성

22 (10 , 12)
7 (31.8%) , 15
(68.2%) . 55 ± 12.2 ,
56 ± 12.0 , 54
± 12.7 . (body
mass index ; BMI) Table 1

2. 수시 혈압과 활동중 혈압

168 ± 27.2/105 ± 13.7mmHg

150 ± 25.8 /93 ± 18.0mmHg

24

24

143 ± 12.1/91 ± 8.3mmHg, 145 ± 12.1/92 ± 9.0mmHg, 141 ± 14.7/89 ± 8.5mmHg

119 ± 9.3/73 ± 6.7, 121 ± 11.0/75 ± 7.6, 116 ± 7.2/72 ± 5.6mmHg

(p<0.05).

24

가

51.1 ± 27.3/49.4 ± 27.3, 55.5 ± 25.3/53.3 ± 28.1, 44.7 ± 33.9/41.9 ± 30.0

8.0 ± 10.6/6.2 ± 6.9, 10.2 ± 16.4/7.9 ± 10.5, 4.4 ± 3.0/2.7 ± 3.2

(p<0.05) (Table 2).

3. 좌심실 질량과 수축기 및 이완기 기능 지표

60.0 ± 5.7% 59.4 ± 6.2%

250.1 ± 73.3g/m² 143.4 ± 43.6g/m², 193.0 ± 58.1g/m² 119.0 ± 30.7g/m²

(Table 3).

0.61 ± 0.15

mm 0.50 ± 0.08mm

(p<0.05).

E velocity, A velocity, E/A ratio MVDT, IVRT

0.60 ± 0.15m/sec, 0.71 ± 0.26m/sec,

Table 1. Clinical characteristics of patients

	Total(n = 22)	WCHT(n = 7)	SHT(n = 15)
Age(year)	55 ± 12.2	56 ± 12.0	54 ± 12.7
Men(%)	45.5	14.3	60.0
BMI(kg/m ²)	26 ± 3.6	24 ± 3.5	27 ± 3.0

WCHT : white-coat hypertensive group
SHT : sustained hypertensive group

0.91 ± 0.48, 264.2 ± 29.1msec, 129.8 ± 18.6msec, 0.57 ± 0.12m/sec, 0.59 ± 0.20m/sec, 1.08 ± 0.46, 255.0 ± 27.2msec, 126.1 ± 12.3msec

Table 2. Office BP and 24 hour ambulatory BP findings in patients

(mmHg)	Total(n = 22)	WCHT(n = 7)	SHT(n = 15)
Office BP			
SBP	162 ± 27.5	150 ± 25.8	168 ± 27.2
DBP	101 ± 15.8	93 ± 18.0	105 ± 13.7
24hour ambulatory			
SBP	136 ± 15.9	119 ± 9.3	143 ± 12.1*
DBP	85 ± 11.3	73 ± 6.7	91 ± 8.3*
Daytime			
SBP	137 ± 16.0	121 ± 11.0	145 ± 12.1*
DBP	87 ± 11.8	75 ± 7.6	92 ± 9.0*
night-time			
SBP	133 ± 17.3	116 ± 7.2	141 ± 14.7*
DBP	83 ± 11.1	72 ± 5.6	89 ± 8.5*
(loading %)			
24hour ambulatory			
SBP	37.4 ± 30.8	8.0 ± 10.6	51.1 ± 27.3*
DBP	35.7 ± 30.6	6.2 ± 6.9	49.4 ± 27.3*
daytime			
SBP	41.1 ± 31.2	10.2 ± 16.4	55.5 ± 25.3*
DBP	38.9 ± 32.0	7.9 ± 10.5	53.3 ± 28.1*
night-time			
SBP	31.9 ± 33.8	4.4 ± 3.0	44.7 ± 33.9*
DBP	29.4 ± 30.9	2.7 ± 3.2	41.9 ± 30.0*

* : p<0.05 when compared WCHT group

SBP : systolic blood pressure

DBP : diastolic blood pressure

Table 3. M-mode echocardiographic findings

	Total(n = 22)	WCHT(n = 7)	SHT(n = 15)
IVSTD(mm)	11.4 ± 2.6	9.9 ± 1.4	12.1 ± 2.7*
IVSTS(mm)	15.0 ± 3.6	12.8 ± 2.8	16.1 ± 3.4
PWTD((mm)	12.4 ± 2.7	10.4 ± 2.0	13.3 ± 2.6
PWTS((mm)	15.2 ± 3.0	13.4 ± 2.2	16.0 ± 3.0
LVEDD((mm)	49.0 ± 6.5	49.6 ± 7.5	48.7 ± 6.3
LVESD(mm)	31.0 ± 6.0	31.7 ± 6.6	30.6 ± 5.8
EF(%)	59.5 ± 5.7	59.4 ± 6.2	60.0 ± 5.7
RWT(mm)	0.57 ± 0.14	0.50 ± 0.08	0.61 ± 0.15*
LVM(g)	232.0 ± 72.7	193.0 ± 58.1	250.1 ± 73.3*
LVMI(g/m ²)	135.6 ± 40.9	119.0 ± 30.7	143.4 ± 43.6*

IVSTD(S) : diastolic(systolic) intraventricular septal thickness, PWTD(S) : diastolic(systolic) posterior wall thickness, LVED(S)D : left ventricular end diastolic (systolic) dimension, EF : ejection fraction, LVM : left ventricular mass, LVMI : LV mass index, * : p<0.05 when compared with WCHT

(Table 4).

4. 24시간 활동 혈압과 좌심실 질량 및 수축기, 이완기 기능 지표와의 연관성

가
24
가

Table 4. Doppler echocardiographic findings

	Total(n = 22)	WCHT(n = 7)	SHT(n = 15)
LVOT(cm)	1.94 ± 0.32	1.87 ± 0.35	1.97 ± 0.31
TVI(cm)	17.2 ± 3.35	17.5 ± 4.08	17.2 ± 3.11
SV(ml)	57.0 ± 12.4	54.0 ± 1.04	58.3 ± 13.4
C.O. (L/min)	4.1 ± 1.0	3.8 ± 0.8	4.3 ± 1.2
C.I. (L/min/m ²)	2.6 ± 1.0	2.5 ± 0.7	2.7 ± 1.1
E velocity (m/sec)	0.57 ± 0.14	0.57 ± 0.12	0.60 ± 0.15
A velocity (m/sec)	0.67 ± 0.24	0.59 ± 0.20	0.71 ± 0.26
E/A ratio	0.97 ± 0.47	1.08 ± 0.46	0.91 ± 0.48
MVDT(msec)	261.0 ± 28.1	255.0 ± 27.2	264.2 ± 29.1
IVRT(msec)	129.8 ± 18.6	126.1 ± 12.3	131.8 ± 21.5

LVOT : LV outflow tract, TVI : time velocity integral, SV : stroke volume, CO : cardiac output, C.I : cardiac index, MVDT : mitral valvular deceleration time, IVRT : isovolumetric relaxation time

(Table 5).

가
%
(r = 0.50, p < 0.05)
(r = 0.55, p < 0.05)
; r = 0.59 p < 0.05, ; r = 0.60 p < 0.05, ; r = 0.51 p < 0.05)

MVDT
E/A ratio, IVRT,

고 안

(renin)
가 , 가
가

Table 5. Correlation coefficients among different methods of BP determination and various cardiac variables

	IVSTD	IVSTS	PWTD	PWTS	LVM	LVMI	RWT
Office							
SBP	0.3816	0.2219	0.3495	0.5652*	0.1447	0.1648	0.3507
DBP	0.5306*	0.3865	0.3686	0.5377*	0.5361*	0.5216*	0.1965
24hr ambulatory							
SBP	0.4933*	0.5216*	0.5490*	0.5250*	0.2578	0.1823	0.5457*
DBP	0.4350	0.5921*	0.4713	0.5762*	0.3403	0.2278	0.4851
daytime							
SBP	0.5084*	0.5574*	0.5549*	0.5611*	0.2962	0.1949	0.5468*
DBP	0.3953	0.5830*	0.4466	0.5806*	0.3510	0.2201	0.4526
night-time							
SBP	0.4294	0.4409	0.5013*	0.4270	0.1792	0.1428	0.4976*
DBP	0.4268	0.5298*	0.4569	0.4966*	0.2767	0.1905	0.4765
(loading %)							
24hr ambulatory							
SBP	0.5509*	0.4858	0.5959*	0.5641*	0.2928	0.2117	0.5869*
DBP	0.4321	0.5539*	0.4668	0.5174*	0.4060	0.2747	0.4816
daytime							
SBP	0.5934*	0.5142*	0.6180*	0.6217*	0.3612	0.2689	0.6016*
DBP	0.4016	0.5706*	0.4513	0.4917	0.4920	0.3271	0.3839
night-time							
SBP	0.4418	0.4034	0.5166*	0.4376	0.1753	0.1146	0.5148*
DBP	0.4251	0.4427	0.4265	0.4559	0.2557	0.1774	0.4782

*p < 0.05 : statistically different from r-values for comparable office and ambulatory BP parameters

ASH(American Society of Hypertension) 135/85mmHg , 31.8% Pierdomenico

가 8,26) 21% 가

24 가

White 7) 가

Yutaka 4) 가 24

가 24

가 1)

가

가 13)

가 IVRT가

가 3)

가

가

가 24

가 8), 21% 58%

가

White 9) E velocity, A velocity

<130/80 to 85mmHg , Pierdo - IVRT, MVDT

menico⁸⁾ <135/85mmHg

Staeszen 10) 24 가 Julius¹⁴⁾

139/87mmH, 146/ 가

91mmHg, 127/79mmHg 가 15)

10)

(ASH : American Society of Hypertension, GHL : German Hypertension League, FSH : French Society of Hypertension)

cut - off point , IVRT 가, MVDT 가 E/A ratio

가

27)

가 16) 15)

가 12),

가 11) ocity가

E/A ratio

24

MVDT, IVRT A vel - 가 , E velocity

- 718 -

방 법 :

1
22 24
, ,
24
결 과 :
1)
7 (31.8%) ,
15 (68.2%) .
2)
가 가 (p<0.05).
3) 24
(r
=0.55, 0.55, 0.50 p<0.05).
4) 24
가
(r=0.59, 0.60, 0.51 p<0.05).
5)
24

결 론 :

가 가
가 가 . 24
가 가 ,

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