

# 본태성고혈압환자에서 백의성효과의 결정인자

박정배<sup>1</sup> · 신현호<sup>1</sup> · 최석구<sup>2</sup>

## Determinants of White Coat Effect in Essential Hypertension

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### ABSTRACT

**Background :** White coat effect (WCE) and white coat hypertension (WCH) are relatively prevalent in clinical situation (20 -57% of WCH in the hypertensive population). The aim of this study was to analyze the determinant factors of WCE. **Methods :** A prospective study was carried out in outpatient clinic in a consecutive hypertensives without receiving pharmacologic treatment. Twenty-four hour ambulatory blood pressure monitoring (ABPM) was performed following more than two resting blood pressure (BP) determinations carried out with the interval of 1 -2 weeks by mercury sphygmomanometer. WCE was calculated for systolic and diastolic BP as the difference between a clinic BP (CBP) and an average daytime ambulatory BP (ABP). WCH was defined as ; BP in the clinic 140/90 mmHg with a mean daytime BP by ABPM 137/ 89 mmHg. **Results :** 1) Two hundred thirty-five patients (mean age 49.7 years, females 74%) were studied. Thirty-seven percent in male and forty-six percent in female patients fulfilled WCH criteria. 2) CBP was significantly correlated to daytime ABP (systolic BP ;  $r = .47$ ,  $p < .001$  and diastolic BP ;  $r = .65$ ,  $p < .001$ ). 3) The magnitude of WCE was greater in the group of WCH ( $28.9 \pm 14.6/19.3 \pm 6.9$  mmHg) than ambulatory hypertensives ( $15.1 \pm 15.7/13.0 \pm 8.2$  mmHg) ( $p < .001$ ). 4) The magnitude of WCE is significantly correlated with female ( $r^2 = .12$ ,  $p < .001$ ) and the stage of CBP according to JNC-V ( $r^2 = .23$ ,  $p < .001$ ) in systolic BP, the stage ( $r^2 = .08$ ,  $p < .001$ ) in diastolic BP, and the stage ( $r^2 = .09$ ,  $p < .001$ ) and weight ( $r^2 = .15$ ,  $p < .01$ ) in mean BP. **Conclusions :** The magnitude of WCE in essential hypertension diagnosed at the clinic is significantly correlated with female, the magnitude of clinic BP, and weight. (Korean Circulation J 1998;28(7):1168-1175)

**KEY WORDS :** White coat effect · White coat hypertension · Ambulatory blood pressure monitoring.

### 서 론

가 30 mmHg

,

1940 Ayman Goldshine

.<sup>1)</sup>

: 1998 4 2

: 1998 6 25

: , 100 - 380

1 - 19

.<sup>2)3)</sup>

가

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( , )

4) “ (Accutracter II, Suntec r) (white coat effect) ” ( 6 ~ 10 ) 20 , 가 24 ( 10 ~ 6 ) 30 . 가 40 , “ (white coat hypert - 40 mmHg , ension) ” “ (isolated clinic hy - 30% 가 가 , 1 1 24 , 24 , 1996 5) 20~57% 가 24 , 6) 24 , 203 ( 104 , 99 ) 가 , “ +2 x ” 137 mmHg, 203 24 , 89 mmHg . (Body mass index ; (kg)/ (m)<sup>2</sup>), ( 3 +), 가 ( , ), ( ) : SPSSWIN 7.0(SPSS inc., Chicago, USA) ± , Student t - test , (stepwise multiple regression analysis) p 0.05 .

### 재료 및 방법

1994 12 1997 6 , . 1 2 2 140 mmHg 90 mmHg(Phase V ) 235 ( 74%, 49.7 ) 임상양상 및 백의성고혈압의 빈도 1994 12 가 61 (46±10 ), 가 174 (51±9 ) . 37%, 46% 가 (p>.05)(Table 1). , 5 , (Yamasu, Ja - 수시혈압과 24시간 활동중 혈압과의 관계 pan) , 1~2 24 160.7 ± 17.4/103.2

$\pm 9.5$  mmHg, 138.5  $\pm$  ( ), 89.7  $\pm$  11.7 : 87.3  $\pm$  10.2 mmHg( 15.4/87.3  $\pm$  10.2 mmHg 24 ),  $p > .05$ )(Fig. 2).

( ;  $r = .47$ ,  $p < .001$ , ;  $r = .65$ , 백의성고혈압과 활동중고혈압에서의 백의성효과와의 차이  $p < .001$ )(Fig. 1).

가 ( : ; 28.9  $\pm$  14.6/19.3  $\pm$  6.9 mmHg 158.5  $\pm$  20.3 : 166.0  $\pm$  18.7 mmHg,  $p < .01$ ( 15.1  $\pm$  15.7/13.0  $\pm$  8.2 mmHg 가 ( $p < .001$ )(Table 2).

( : ; 143.2  $\pm$  17.1 mmHg : 백의성효과와의 특징 137.0  $\pm$  14.9 mmHg,  $p < .01$ ). ( 25/16 mmHg)가 (

: 107.2  $\pm$  12/15 mmHg) , 가 (Fig. 3).

1993 (JNC - V) 가 1

18/13 mmHg, 2 20/16 mmHg, 3 29/20 mmHg, 4 31/21 mmHg

가 가 , 180/110 mmHg(3 ) 가 ( $p < .05$ )(Fig. 4).

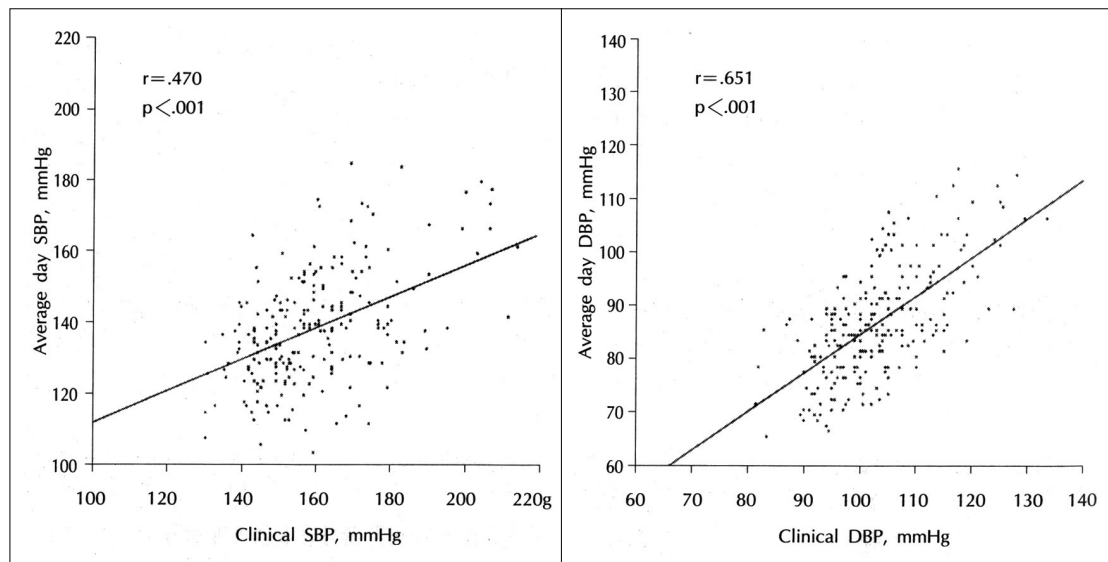
( $r = .34$ ,  $p < .01$ ), ( $r = .254$ ,  $p < .001$ ), ( $r = .19$ ,  $p < .01$ ) ,

( $r = .313$ ,  $p < .001$ ) 가

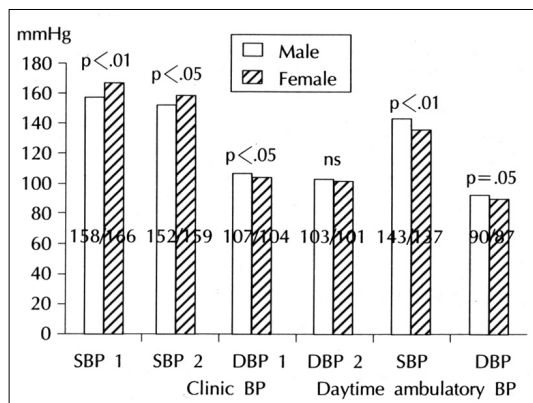
**Table 1.** Demographic data

	Male	Female	p
Number	68	213	
Age (yr)	46 $\pm$ 10	51 $\pm$ 9	< .001
BMI (kg/m <sup>2</sup> )	25.9 $\pm$ 2.8	25.8 $\pm$ 3.3	ns
Weight (kg)	72 $\pm$ 9	62 $\pm$ 9	< .001
Cholesterol (mg/dl)	198 $\pm$ 39	208 $\pm$ 43	ns
WCH (%)	37	46	ns

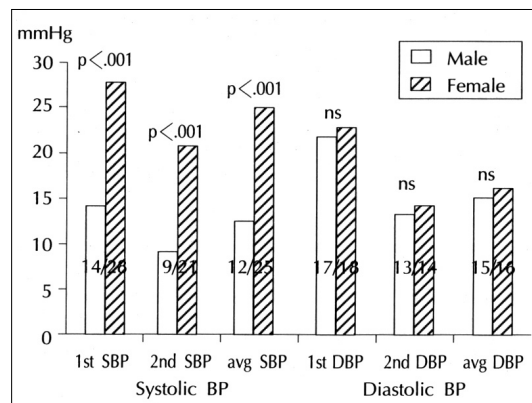
BMI : body mass index WCH : white coat hypertension  
ns : nonspecific



**Fig. 1.** Clinic blood pressure (BP was significantly correlated to daytime ambulatory BP (systolic BP ;  $r = .47$ ,  $p < .001$  and diastolic BP ;  $r = .65$ ,  $p < .001$ ).



**Fig. 2.** Clinic systolic blood pressure (BP) is greater in female than male ( $p<0.1$ ), but ambulatory BP is reversed ( $p<0.1$ ). There was no significant difference in diastolic BP. As concerns systolic BP in the clinic, BP difference is more prominent at the first visit (BP 1 or 2 : systolic blood pressure at first or second visit.).



**Fig. 3.** The magnitude of WCE is significantly greater in female than male only in case of systolic blood pressure ( $p<0.01$ ).

가 (r

**Table 2.** White coat effect of WCH and AHT

WCE	WCH (n = 124)	AHT (n = 157)	p
SBP 1st	32.6 ± 17.3	18.2 ± 17.3	<.001
SBP 2nd	25.3 ± 16.4	12.1 ± 17.2	<.001
Average SBP	28.9 ± 14.6	15.1 ± 15.7	<.001
DBP 1st	21.1 ± 8.3	14.9 ± 9.2	<.001
DBP 2nd	17.5 ± 8.0	11.1 ± 8.9	<.001
Average DBP	19.3 ± 6.9	13.0 ± 8.2	<.001
MBP 1st	25.5 ± 10.2	16.8 ± 12.1	<.001
MBP 2nd	20.6 ± 9.6	12.2 ± 11.5	<.001
Average MBP	23.0 ± 8.6	14.5 ± 10.9	<.001

WCE : white coat effect WCH : white coat hypertension

AHT : ambulatory hypertension SBP : systolic blood pressure

DBP : diastolic blood pressure 1st : first visit 2nd : second visit

= -.13,  $p<.05$ ),

가 (Table 3).

, ( $r^2=.12$ ,  $p<.001$ ), ( $r^2=.23$ ,  $p<.001$ ),

( $r^2=.08$ ,  $p<.001$ ),

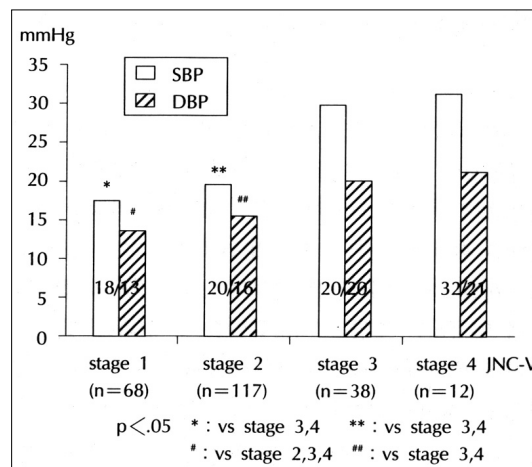
( $r^2=.09$ ,  $p<.001$ ) ( $r^2=.15$ ,  $p<.01$ )

(Table 4).

## 고 찰

1940 Ayman Goldshine 34

가



**Fig. 4.** White coat effect is more prominent in stage 3 or 4 than stage 1 or 2 according to JNC-V classification.

가 1)

70/36 mmHg

104

가

(pressure response)

가

가

. 24

, Kain



가 .<sup>26)</sup> Kuwajima .<sup>27)</sup> Gosse

가 204

가 4

가 , 가

가 , 가

가 , 가<sup>28)</sup>

가 , Talyor Manifest Anxiety Scale 가 (Cornell product, Laughlin 가 )가 가 , 가

가<sup>22)23)</sup> Mancia 가 가

23/18 mmHg 가 가 , 가

가 가

가 가 , 가

가 가 , 가

가 가

가 , 가

가 . Amigo 가 , 24

가 , 5~10 mmHg

가<sup>24)</sup> Pickering , 24

가 , 연구배경 : ( 가<sup>15)</sup> )

가 , 140/90

가<sup>21)25)</sup> mmHg

가 , 방 법 : 235 ( 가 140/90 mmHg ) 24 ( 가 ) , , , 739 5 137/89 mmHg

결 과 :

1) 235 ( 49.7 , 74%)  
37%, 46%

2)  
( : r=.47, p<.001,  
: r=.65, p<.001).

3) /  
28.9 ± 14.6/19.3 ± 6.9 mmHg  
15.1 ± 15.7/13.0 ± 8.2 mmHg  
가 (p<.001).

4) (r<sup>2</sup>=.12, p<.001),  
(r<sup>2</sup>=.23, p<.001) ,  
(r<sup>2</sup>=.08, p<.001) ,  
(r<sup>2</sup>=.09, p<.001) (r<sup>2</sup>=.15, p<.01)

결 론 :

, 가 ,  
가 .

중심 단어 : . 24

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