

칼슘 통로 차단제로 본태성 고혈압 환자의 내피 세포 기능 이상은 호전되는가?

배 장 호

Can We Restore the Endothelial Dysfunction in Patients with Essential Hypertension with Calcium Channel Blockers ?

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ABSTRACT

Background and Objectives : We performed this study to compare the endothelial function of the patients with newly diagnosed essential hypertension (EH) to age and sex-matched normal subjects or patients with known coronary artery disease (CAD) and to evaluate the effect of calcium channel blockers (amlodipine) on the endothelial dysfunction in patients with EH. **Materials and Methods :** The endothelial function, expressed as percent brachial artery diameter changes at hyperemic phase compared to resting state, using high-resolution ultrasound was measured before taking amlodipine and 3 to 4 months after taking amlodipine (5 to 10 mg daily), when the high blood pressure (BP) was well controlled (129/83 mmHg), in patients with EH (mean age : 53 yrs, n = 12). We also measured the endothelial function in normal subjects (mean age : 54 yrs, n = 25) and patients with proven CAD (mean age : 56 yrs, n = 30). **Results :** The mean BP of the patients with EH, CAD, and normal subjects were 172/108 mmHg, 110/69 mmHg, and 113/72 mmHg, respectively. There were no significant differences among the study groups in regard to the serum glucose and various lipid levels. The endothelial function of the patients with EH ($6.6 \pm 2.3\%$) was significantly ($p = 0.000$) lowered when compared to the normal subjects ($14.3 \pm 3.3\%$), but did not show any significant differences when compared to the patients with CAD ($8.6 \pm 3.4\%$). The endothelial function in patients with EH was significantly ($p = 0.007$) improved from $6.6 \pm 2.3\%$ to $11.0 \pm 2.7\%$ 3 to 4 months after taking the amlodipine. **Conclusion :** Calcium channel blockers, especially amlodipine, can improve endothelial dysfunction in patients with EH as well as controlling high BP. (**Korean Circulation J 2000;30(8):1010-1016**)

KEY WORDS : Endothelial dysfunction · Essential hypertension · Amlodipine.

서 론

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가 , 가

nitric oxide가
³⁾ 가

Angiotensin converting enzyme(ACE) inhibitors 가
 angiotensin II - induced oxidative stress
 가 oxidative inactivation
⁴⁾ bradykinin
⁵⁾ ACE inhibitors .

angiotensin I angiotensin II
 bradykinin

재료 및 방법

대 상

ACE inhibitors 12 (: 53),
 가 가
⁶⁾⁷⁾ 25 (: 54),
 1 50%
 30 .

C

가 5
 가
 angiotensin II 가 7 .
 bradykinin 1 cholesterol
 amlodipine triglyceride가 220 mg/dl 6
 NCEP ⁸⁾
⁷⁾

Table 1. Clinical characteristics of the study population

Group	HBP	Control	CAD	P1	P2
Number	12	25	30		
Age (yrs)	53 ± 10	54 ± 8	56 ± 7	NS	NS
Sex (M/F)	5/7	14/11	21/9	NS	NS
Hypertension (%)	12 (100)	0 (0)	9 (30)	0.000	0.000
Diabetes (%)	1 (8.3)	0 (0)	4 (13)	NS	NS
Smoking (%)	0 (0)	0 (0)	6 (20)	NS	NS
Hyperlipidemia (%)	6 (50)	0 (0)	5 (17)	0.000	0.041
Numbers of major arteries narrowed > 50% in diameter					
1			14 (47)		
2			11 (37)		
3			5 (17)		

HBP : patients with hypertension, CAD : patients with coronary artery disease, P1 : p value between the HBP group and the control, P2 : p value between the HBP group and the CAD group, NS : not significant

가 14 가 11 , ylurea
가 21 가 9 amlodipine
(Table 1).
1992 Celer -
9 (30%), majer ¹¹⁾
4 (13%), 가 6 (20%),
가 5 (17%)
Joint National Committee , 가
6 ⁹⁾
(time velocity integral)
가 Joint National Committee 6
2 2
140 mmHg
90 mmHg . Joint
National Committee 6 5 300 mmHg
stage stage 2가 6 stage 3 6 0 mmHg
risk group group A가 3 , group B 1
가 8 , group C가 1
가
검사 순서
10
glucose, total cholesterol, triglyc-
eride, HDL - cholesterol LDL - chol-
esterol ¹⁰⁾
가 20 25
5 Sonos 5500 7.5 MHz Hewlett - Packard
15 가
aml -
odipine 5 10 mg 2
3 / 140/90 가
mmHg 10 1
3 1 가
amlodipine 1 140/90 가
mmHg ¹²⁾
1 sulfon -

통계 처리 172/108 mmHg
 \pm 113/72 mmHg, 110/69
 SPSS 7.5 p 0.05 mm Hg
 one way total cholesterol, triglyceride, HDL - cholesterol, LDL - cholesterol, fasting blood glucose
 ANOVA 가 (Table 2).
 chi - square test Fisher's exact test
 Wilcoxon signed
 rank test
 pearson correlation coeffi - 4.2 ± 0.6 mm, 4.5 ± 0.6 mm, 4.2 ± 0.8 mm 가
 cient 가
 결 과 $14.3 \pm 3.3\%$ $6.6 \pm 2.3\%$ $8.6 \pm 3.4\%$
 대상군에서 혈압 및 혈액 검사의 차이 / 가

Table 2. Mean blood pressure and laboratory findings of the study population

Group	HBP	Control	CAD	P1	P2
Number	12	25	30		
Blood pressure (mmHg)					
Systolic	172	113	110	0.000	0.000
Diastolic	108	72	69	0.000	0.000
Total cholesterol (mmHg)	202	188	199	NS	NS
Triglyceride (mmHg)	174	137	214	NS	NS
HDL-cholesterol (mmHg)	46.1	49.5	37.8	NS	NS
LDL-cholesterol (mmHg)	121	110	118	NS	NS
FBS (mmHg)	95	80	103	NS	NS

HBP : patients with hypertension, CAD : patients with coronary artery disease, HDL : high-density lipoprotein, LDL : low-density lipoprotein, FBS : fasting blood sugar, P1 : p value between the HBP group and the control, P2 : p value between the HBP group and the CAD group, NS : not significant

Table 3. Comparison of brachial artery diameter at baseline and hyperemic phase and flow-mediated brachial artery dilation (FMD) in the study groups

Group	Hypertension		Control	CAD	P1	P2
	Before	Follow up				
Number	12	9	25	30		
Brachial artery D						
Baseline (mm)	4.5 ± 0.6	4.5 ± 0.5	4.2 ± 0.6	4.2 ± 0.8	NS	NS
Hyperemic (mm)	4.8 ± 0.7	5.0 ± 0.5	4.8 ± 0.7	4.5 ± 0.8	NS	NS
FMD (%)	6.6 ± 2.3	$11.0 \pm 2.7^*$	14.3 ± 3.3	8.6 ± 3.4	0.000	NS

CAD : patients with coronary artery disease, D : diameter, FMD : expressed as percent artery diameter changes, P1 : p value between the HBP group and the control, P2 : p value between the HBP group and the CAD group, * : p = 0.008 compared with the data of the before, NS : not significant

가 (Table 3).⁵⁾ , 가

6.6 ± 2.3% , amlodipine 5 10 mg 3 4 / 140/90 mmHg

11.0 ± 2.7% (Table 3). , amlodipine / JNC - VI⁹⁾ stage 2

172/108 mmHg

129/83 mmHg

amlodipine

가

- 0.020, 0.142 Khaper¹⁵⁾ ACE inhi - biotor - adrenergic blocking agents

고 찰

가

1)

ACE inhibitor vitamin C 가⁶⁾¹³⁾

shear stress

가

14)

vitamin C nifedipine hydrochlorothiazide 가 가

13)

, angiotensin II 가 가 가 , ACE inhi - biotor angiotensin II bradykinin

ACE inhibitor

⁶⁾ ACE inhibitor bradykinin ,⁶⁾¹⁶⁾ prazosin

NO¹⁵⁾¹⁷⁾ , prazosin

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