

관상동맥질환을 가진 환자에서 Ramipril이 혈관에 미치는 영향

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Effects of Ramipril on Vascular Response in Patients with Coronary Artery Disease

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ABSTRACT

Background and Objectives : Angiotensin-converting enzyme (ACE) inhibitors have been shown to improve the endothelial dysfunction and prevent the development of atherosclerosis in animal models. We performed this study to investigate the effects of the ACE inhibitor, ramipril, on carotid atherosclerosis and endothelial dysfunction of the brachial artery in patients with coronary artery disease (CAD). **Subjects and Methods :** We studied 69 subjects with a mean age of 59yrs, and divided them into two groups according to ramipril use (39 patients with ramipril and 30 without). Using a double-blind, randomized, prospective design, we measured the flow-mediated vasodilatation (FMD) of the brachial artery and intima-media thickness (IMT) of the carotid artery, prior to, and 1, 3 and 6 months following coronary angiograms in CAD patients. **Results :** The FMD was significantly increased in the ramipril group from $4.6 \pm 2.2\%$ baseline to $5.3 \pm 2.5\%$ at the 1 month follow-up ($p < 0.05$), but at the 3 and 6 month follow-ups no significant changes were found. There were no significant differences in the FMD between the two groups at any of the follow-up periods, and no changes in the IMT were found in relation to time for either group. **Conclusion :** Ramipril improved the endothelial dysfunction in patients with CAD for the first month ; however this effect did not persist 3 or 6 months after taking ramipril. Ramipril had no effect on the atherosclerotic vascular changes to the IMT of carotid arteries. (Korean Circulation J 2002;32(8):674-679)

KEY WORDS : Ramipril ; Endothelium ; Carotid arteries.

서 론

가 . (antiatherogenic effects)⁴⁾

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측정자의 관찰자내(간) 변이

() 가

가

20 Videotape

가

20 Videotape

0.997,

0.997

IMT

0.996,

0.991

통계처리

SPSS 7.5 , 95%

p 0.05

FMD

IMT

paired t - test

, Ramipril

independ-

dent t - test

Chi - square test

결 과

대상 환자의 임상적 특성 (Table 1)

69 Ramipril

39 , 30

22 (56%),
13 (43%) 17 (44%), 17
(57%) . Ramipril

54%, 43%

가

Table 1. Characteristics of the study subjects

	With ramipril	Without ramipril
Number (n)	39	30
Age	59 ± 10	59 ± 10
Sex (M : F)	31 : 8	20 : 10
Hypertension	16 (41%)	8 (27%)
Diabetes	6 (15%)	8 (27%)
Smoking	25 (64%)	16 (53%)
Hyperlipidemia	15 (39%)	10 (33%)
Diagnosis		
Angina	22 (56%)	13 (43%)
Myocardial infarction	17 (44%)	17 (57%)
Narrowed (>50%) coronary vessel		
1	21 (54%)	13 (43%)
2	12 (31%)	7 (23%)
3	6 (15%)	11 (33%)

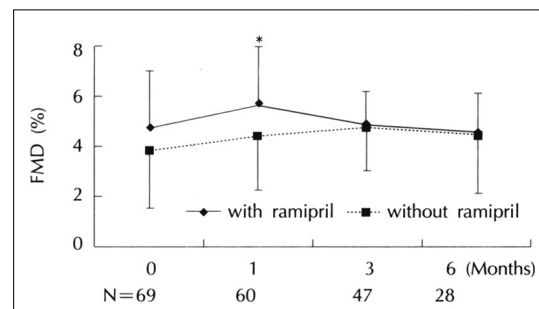


Fig. 2. Serial changes of percent FMD according to use of ramipril in patients with coronary artery disease. * : p<0.05 on paired t-test in one group. FMD : flow-mediated vasodilation.

내피세포기능

Ramipril FMD 4.6 ± 2.2% , 1 5.3 2.5%

가 (p<0.05).

3 6 FMD

(4.8 ± 1.8%,

4.8 ± 1.6%). Ramipril

FMD(3.8 ± 2.2%) 1, 3, 6

FMD 가 (4.4

± 1.9%, 4.7 ± 1.5%, 4.6 ± 1.5%). Ramipril

FMD ramipril

(Fig. 2, Table 2).

Table 2. Flow mediated vasodilation (FMD) of brachial artery and intima-media thickness (IMT) of carotid artery according to ramipril use

	0	1	3	6 (months)
FMD (%)				
with ramipril	4.6 ± 2.3	5.1 ± 2.6*	4.7 ± 1.4	4.7 ± 1.4
without ramipril	3.8 ± 2.3	4.3 ± 1.8	4.8 ± 1.6	4.7 ± 1.6
IMT (mm)				
CCA				
with ramipril	0.99 ± 0.36	1.04 ± 0.37	0.95 ± 0.26	0.84 ± 0.08
without ramipril	0.95 ± 0.36	0.93 ± 0.33	0.80 ± 0.27	0.87 ± 0.12
CB				
with ramipril	1.03 ± 0.24	0.98 ± 0.25	0.98 ± 0.26	0.88 ± 0.14
without ramipril	0.95 ± 0.16	0.95 ± 0.12	0.89 ± 0.10	0.97 ± 0.18
ICA				
with ramipril	0.67 ± 0.13	0.68 ± 0.10	0.67 ± 0.91	0.64 ± 0.08
without ramipril	0.67 ± 0.11	0.65 ± 0.08	0.66 ± 0.89	0.65 ± 0.10

CCA : common carotid artery, CB : carotid bulb, ICA : internal carotid artery, * : p<0.05 on paired t test in one group

경동맥 내막중막두께측정
ramipril
0.99 ± 0.36 mm, 0.95 ± 0.36 mm, 1, 3, 6
(Table 2).

inactivation
NO
Kjoller - Hansen
가
ramipril
가
가
가
가
Mancini¹⁴⁾
Quinapril 6
nitric oxide
ramipril
Mancini¹⁴⁾
Mancini¹⁴⁾
Mancini
acetycho-
line
angiotension II - in-
duced oxidative stress
NO가 oxidative

¹⁰⁾ Bradykinin 가
NO
¹¹⁾
¹²⁾
¹³⁾
¹⁴⁾
superoxide
가
¹⁴⁾
1

ramipril 가 ramipril
가
6 3
ramipril
quinapril
ramipril
ramipril
6
FMD

FMD가 ramipril

ril FMD
가
paired t - test 1
가
ramipril
ramipril 1

결론

6
가

요약

15)
가
배경 및 목적 :
16)
17)
mipril

rennin - angiotensin - aldosterone system ramipril
가

(antiproliferative action), (antimito-
genic action),
(plaque - stabilizing action), (antithrom-
botic action),
(antioxidant action)
12) Lonn 8) ramipril
50% 69
ramipril 39
30

방 법 :

, 1, 3, 6

결 과 :

Ramipril 1
가 , 3
, ramipril

결 론 :

Ramipril
가 ,
6

중심 단어 : Ramipril ; ; .

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