

관상동맥 중재술 후 허혈성 심부전 환자에서 이미다프릴 저용량 및 고용량과 로살탄 병합요법의 효과

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The Comparison among Low and High doses of Imidapril, and Combined Imidapril with Losartan in Patients with Ischemic Heart Failure after Coronary Intervention

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ABSTRACT

Background and Objectives : Angiotensin converting enzyme inhibitor and angiotensin receptor blocker has been used in the treatment of heart failure. However, the effects of both agents are not known exactly in patients with ischemic heart failure. The clinical effects of imidapril, losartan and its combination on ischemic heart failure were observed after percutaneous coronary interventions (PCI). **Methods :** Thirty six patients (58 ± 8.8 year-old, 30 male) with myocardial infarction who underwent PCI with ejection fraction less than 45% by echocardiogram were included. The patients were divided into four groups ; low (5 mg) and high (10 mg) doses of imidapril (Group : 58 ± 6.1 years, M : F = 7 : 2 and : 61 ± 6 years, M : F = 8 : 1), combination of low dose imidapril and 50 mg losartan (Group : 56 ± 13 years, M : F = 9 : 0), and losartan alone (Group : 57 ± 9.3 years, M : F = 6 : 3). Clinical symptoms of angina and dyspnea, laboratory changes, exercise tolerance by treadmill test, and left ventricular function with dimension, and wall motion score by echocardiogram were observed at 4-week interval for 12 weeks. **Results :** There were no significant differences among 4 groups in baseline clinical characteristics. In group , dyspnea and ejection fraction improved 12 weeks after therapy. Dyspnea and exercise tolerance improved in group . However, dyspnea and left ventricular function were unchanged in group , and 4 of them developed hypotension. In group , left ventricular ejection fraction improved after therapy. Dry cough was observed in 3 of imidapril-treated patients, but withdrawal of drug was performed only in one of Group . **Conclusions :** Monotherapy of imidapril or losartan is effective in the management of ischemic heart failure, but its combination shows no additional benefit. (Korean Circulation J 2000;30(8):965-972)

KEY WORDS : Ischemic heart failure Imidapril Losartan.

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area - length method

서 론

45%

(angiotensin converting enzyme inhibitor : ACEI) renin - angiotensin - al - dosteron - system(RAAS)

Joint National Committee stage

가

1-3)

Imidapril ACE - SH

가 4) 가 19 5) 1 대상환자의 분류

plasminogen activator

mg, imidapril 10 mg, imidapril 5 mg losartan 50 mg lo - sartan 50 mg

2) , Im -

idapril ACEI angiotensin bradykinin

36 (58±8.8 , : =30 : 6)

9 (58±6.1 , : =7 : 2), 9 (61±6 , : =8 : 1), 9 (57±13 , : =9 : 0), 9 (57±9.3 , : =6 : 3) ,

6) angiotensin angiotensin receptor

가 RAAS . Angi - otensin receptor ACEI

방 법

ACEI 가 1 ACE

7) ACEI가 5 mg 1 imidapril 10 mg imidapril losartan 25 mg

ACEI cilazapril 가 50 mg losartan 50 mg

8)

ACEI Imidapril an - giotensin receptor Losartan 100 200 mg

1

4 1

대상 및 방법

12 3

대상환자의 선정

1999 4 11

NYHA functional class, Canadian Cardiovascular Society class 가

9) area - length method

New York Heart Association functional class

통계 처리

(Table 1).

ANOVA test, paired t - test, p = 0.05, 임상 증상의 호전, imida - NYHA class, 3.11 ± 1.05, 2.89 ± 0.87, 1.56 ± 0.72, 1.56 ± 0.87, (Table 2), (Table 3). CCS class 3.78 ± 0.44, 1.56 ± 0.53, 3.44 ± 0.68, 2.11 ± 0.93, 3.60 ± 0.49, 1.80 ± 0.40, 3.67 ± 0.71, 2.00 ± 0.50, (Table 3).

Table 1. Baseline clinical characteristics of four groups

	Group	Group	Group	Group	p value
Age (year)	58 ± 6.1	61 ± 4.6	54 ± 17	57 ± 9.3	NS
Sex (M : F)	7 : 2	8 : 1	5 : 0	6 : 3	
Smoking	55%	44%	50%	66%	NS
Diabetes	33.3%	44.4%	50%	44.4%	NS
Hypertension	33.3%	55.5%	40%	44.4%	NS
Alcohol	55.5%	44.4%	60%	55.5%	NS
LDL-C (mg/dl)	121.5 ± 26.3	119.2 ± 28.7	113.7 ± 31.4	145 ± 39.3	NS
Potassium (mEq/L)	4.1 ± 0.5	4.0 ± 0.8	4.3 ± 0.4	4.3 ± 0.5	NS
Sodium (mEq/L)	139 ± 3.1	142 ± 3.8	141 ± 3.0	142 ± 4.0	NS
Creatine (mg/dl)	1.5 ± 0.3	1.3 ± 0.3	1.2 ± 0.3	1.2 ± 0.6	NS

LDL-C : low density lipoprotein, Group : low dose imidapril, Group : high dose imidapril, Group : Combined imidapril with losartan, Group : losartan

Table 2. Changes of clinical and echocardiographic findings in 4 groups before (B) and after (A) treatment

		Group	(n = 9)	Group	(n = 9)	Group	(n = 9)	Group	(n = 9)
Dyspnea (NYHA class)	B		3.11 ± 1.05		2.89 ± 0.87		3.00 ± 1.26		3.11 ± 0.93
	A		1.56 ± 0.72 [†]		1.56 ± 0.68 [§]		2.40 ± 0.49		2.22 ± 0.83
Angina (CCS class)	B		3.78 ± 0.44		3.44 ± 0.68		3.60 ± 0.49		3.67 ± 0.71
	A		1.56 ± 0.53 [§]		2.11 ± 0.93*		1.80 ± 0.40 [‡]		2.00 ± 0.50 [§]
Exercise duration at treadmill test (second)	B		684 ± 204		642 ± 132		792 ± 95		696 ± 210
	A		810 ± 144		804 ± 240*		984 ± 84		918 ± 132
Ejection fraction (%)	B		37.8 ± 6.3		40.1 ± 4.1		40.3 ± 2.5		37.4 ± 7.4
	A		46.4 ± 9.2*		48.3 ± 10.0		49.3 ± 8.0		48.9 ± 10.9 [†]
LVEDD (mm)	B		55.3 ± 4.8		55.1 ± 4.9		55.4 ± 3.2		52.4 ± 7.6
	A		56.2 ± 5.4		56.3 ± 5.4		56.1 ± 5.2		53.8 ± 8.6
TWMS	B		26.8 ± 4.1		27.2 ± 4.9		27.8 ± 2.4		30.4 ± 6.2
	A		23.1 ± 6.2		24.1 ± 6.1		22.4 ± 4.4		23.2 ± 4.8*

LVEDD : Left ventricular end diastolic dimension, TWMS : Total wall motion score, NYHA : New York Heart Association, CCS : Canadian Cardiovascular Society, A : Before treatment, B : 12 weeks after treatment, Comparison between A and B, *p<0.05, † p<0.01, ‡ p = 0.001, § p<0.001

Table 3. Improvement of clinical symptoms

	Group 1	Group 2	Group 3	Group 4	p-value
Dys pnea (NYHA class*)					
Baseline	3.11 ± 1.05	2.89 ± 0.87	3.00 ± 1.26	3.11 ± 0.93	NS
4 weeks	1.56 ± 0.52	1.67 ± 0.67	2.80 ± 0.40	2.11 ± 0.91	NS
12 weeks	1.56 ± 0.72	1.56 ± 0.68	2.40 ± 0.49	2.22 ± 0.83	NS
Angina class (CCS class [†])					
Baseline	3.78 ± 0.44	3.44 ± 0.68	3.60 ± 0.49	3.67 ± 0.71	NS
4 weeks	1.89 ± 0.78	2.11 ± 0.93	2.00 ± 0.63	2.44 ± 0.53	NS
12 weeks	1.56 ± 0.53	2.11 ± 0.93	1.80 ± 0.40	2.00 ± 0.50	NS

* : New York Heart Association, † : Canadian Cardiovascular Class

감압 효과

117.8 ± 14.0
mmHg, 125.6 ± 18.9 mmHg, 123.3 ± 11.2
mmHg 137.8 ± 14 mmHg
4 102.2 ± 11.2 mmHg
(p<0.01) 12 118.9 ± 13.7 mmHg,
113.3 ± 24.5 mmHg, 106 ± 12.4 mmHg,
127.8 ± 22.0 mmHg imidapril losartan
imidapril
, imidapril
가 (Fig. 1). Imidapril losartan
4 90 mmHg
8

관상동맥 조영술 및 중재술

가 (p<0.01),
7 3 26.8 ± 4.1, 27.2 ± 4.9, 27.8 ± 2.4,
(p<0.05), 4, 5 30.4 ± 6.2 23.1 ± 6.2, 24.1 ± 6.1, 22.4 ±
, 2, 2 4.4, 23.2 ± 4.8
, TIMI Flow
, 36
5
, 3, 5, 3 가
(Table 4).

좌심실 기능 및 벽운동의 변화

37.8 ± 6.3, 40.1 ± 4.1, 40.3 ± 2.5,
37.4 ± 7.4 46.4 ± 9.2, 48.3 ± 10.0, 49.3
± 8.0, 48.9 ± 10.9% 12

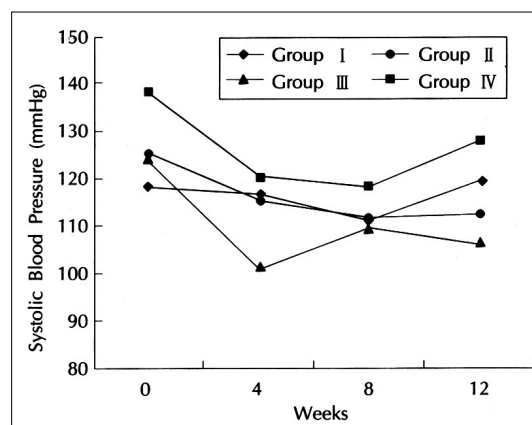


Fig 1. Changes of mean systolic blood pressure at fourth, eighth and twelfth weeks after therapy. Group I : low dose of imidapril, Group II : high dose of imidapril, Group III : combined low dose of imidapril and losartan, Group IV : losartan

5 답차형 운동부하 검사에 의한 운동력의 변화

684 ± 204, 642 ± 132, 792 ± 95,
696 ± 210 12 810 ± 144, 804 ± 240,
984 ± 84, 918 ± 132 가
(p<0.05), (Table 6).

약물의 안정성

Imidapril 27 3

Table 6. Improvement of exercise tolerance by treadmill test

	Group	Group	Group	Group	p-value
At baseline (sec)	684 ± 204	642 ± 132	792 ± 95	696 ± 210	
At 12 weeks (sec)	810 ± 144	804 ± 240	982 ± 84	918 ± 132	
†	126 ± 60	162 ± 188	192 ± 182	222 ± 268	NS

† : time difference = 12 weeks - baseline

Table 7. Laboratory changes in four groups before (B) and after (A) treatment

	Group	Group	Group	Group	p-value
Blood urea nitrogen (mg/dl)	B	22.4 ± 11.9	13.4 ± 2.4	17.2 ± 6.2	17.2 ± 14.0
	A	18.4 ± 6.2	12.4 ± 4.3	13.6 ± 1.9	18.3 ± 14.6
Creatine (mg/dl)	B	1.4 ± 0.3	1.0 ± 0.3	1.0 ± 0.3	1.0 ± 0.6
	A	1.4 ± 0.2	1.0 ± 0.2	1.2 ± 0.2	1.2 ± 0.6
Sodium (mEq/L)	B	139.2 ± 3.1	141.7 ± 3.8	140.3 ± 3.0	140.4 ± 4.0
	A	139.8 ± 2.1	140.6 ± 2.3	138.8 ± 2.5	138.6 ± 4.4
Potassium (mEq/L)	B	4.1 ± 0.5	4.0 ± 0.8	4.3 ± 0.4	4.3 ± 0.5
	A	4.4 ± 0.5	3.8 ± 0.1	4.2 ± 0.2	4.8 ± 0.8

ACEI
¹⁴⁾ ACEI, angiotensin receptor blocker
 ACEI
 bradykinin, angiotensin receptor, imidapril, imidapril, ACE
 angiotensin, ACE, 19, imidapril, -SH 가, ACE
¹⁵⁻¹⁷⁾ ACE, 4)5) 1
 angiotensin 가, 5.8%, 2.8%
¹⁸⁾ ACE, 15, 20%
²⁾⁴⁾⁵⁾²¹⁾ 11%, 3.7%
³⁾¹⁹⁾²⁰⁾ ACE, angiotensin receptor
 ACEI, imidapril, angiotensin receptor, losartan
 losartan, 2.3%, ¹⁸⁾
 plasminogen activator
¹¹⁾
 10 mg
 ACEI, cilazapril, ACE 90%, 24
⁸⁾ ACEI, angiotensin 가, 2.5 mg, 가
 receptor, 20, 40 mg, 가

22)23)

1)

imidapril

Losartan

imidapril

losartan imidapril

가 4

ACE angiotensin receptor

가

본 연구의 제한점

가 , 3

결 과 :

imidapril

27 3 11%

1 3.7%

결 론 :

imidapril

losartan

가 , 가

중심 단어 :

요 약

연구목적 :

imidapril

losartan

대상 및 방법 :

45% 36

imidapril 9 (; 58 ± 6.1

: =7 : 2) imidapril 9 (; 61 ± 6

: =8 : 1), imidapril losartan 9

(; 56 ± 13 : =9 : 0) losartan

9 (; 57 ± 9.3 : =6 : 3)

, 4 3

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