

심근경색에 의해 유발된 심부전 백서에서 혈관작용물질의 변화에 관한 연구*

**

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= Abstract =

Evolutional Change of Vasoactive Substances in Rat Model of Chronic Heart Failure

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Background : Myocardial infarction(MI) in the rat is a model of ventricular dysfunction which is associated with activation of compensatory neurohumoral systems. This study was designed to determine the temporal evolution of the regulatory factors-atrial natriuretic peptide(ANP), endothelin(ET), plasma renin activity(PRA) in rats with more than moderate sized MI at 1, 4, 8 weeks in comparison to normal rats.

Methods and Results : MI was created in female Sprague Dawley rats weighing 250gms to 300gms by ligating the anterior descending artery. Before sacrifice, hemodynamics were measured and blood was drawn in control rats(n=8) and rats with MI 1(n=7), 4(n=10), and 8 weeks(n=9) after surgery. Heart weight index increased from 329.0 ± 7.3 mg/gm at baseline to 380.6 ± 18.4 mg/gm, 441.1 ± 23.2 mg/gm, 416.4 ± 29.2 mg/gm at the 1st, 4th, and 8th weeks after MI. Plasma ANP increased in the 1st week and remained elevated(16 ± 7 , 259 ± 65 , 404 ± 72 , 494 ± 73 pg/ml at baseline, 1st, 4th, 8th weeks after MI respectively). Plasma endothelin was suppressed at 4th week but elevated at 8th week(7.8 ± 0.2 , 5.3 ± 0.3 , 11.9 ± 1.3 pg/ml at baseline, 4th, 8th weeks respectively). PRA, indirect index of plasma angiotensin also decreased at 4th week but elevated at 8th week(14.9 ± 0.3 , 9.8 ± 1.0 , 20.3 ± 1.8 ng/ml/hr at baseline, 4th, 8th weeks respectively).

Conclusion : These results demonstrate a biphasic response of endothelin and PRA after MI despite the inhibitory effects of ANP. These data support the important differential regulation of humoral factors in the evolution of acute MI.

KEY WORDS : ANP · Endothelin · Plasma renin activity · Neurohumoral activation · Myocardial infarction.

서 론

3 가
1). 가 가 가 가 가 가 가 가
가 가 가 가 가 가 가 가

연구 대상 및 방법

1. 심근경색 백서의 준비

가 250gm 300gm -
가 25mg/kg Harvard rodent
가 ventilator . 4
가 6.0
가
가 1, 4, 8

2. 혈액학적 인자의 측정

가 2,3,4,5). 1, 4, 8 가 Inactin
가 U
가 PE - 50
가 6,7).
가 9ml
가 가
가 5% paraformaldehyde
가 Masson Trichrome 가
가 8). 25%
가 가 1

7, 4 10, 8
 9 8

3. 호르몬의 측정

EDTA

2500rpm 4
 -20

1ml

C-18 Bond Elute cartridge
 1% trifluoroacetic acid/95% ethanol
 ANP 99-126

C

Vycor glass
 0.05mol 60%

DuPont

4. 통계

ANOVA Student t-test
 p < 0.05

결 과

1. 백서의 심장 및 혈액학적 변화

124.2 ± 4.4mmHg

1 101.8 ± 3.3mmHg
 4 112.2 ± 6.8mmHg,
 8 103.3 ± 8.0mmHg

(/) 가 329.0 ± 7.3mg/gm
 1 380.6 ± 18.4 mg/gm,
 4 441.1 ± 23.2mg/gm, 8 416.4 ± 29.2 mg/gm
 가 (p < 0.05).

2. 혈중 호르몬의 변화

ANP 가

16.4 ± 7.1pg/ml, 1 259.0 ± 65.1pg/ml,
 4 404.7 ± 71.5pg/ml, 8 493.7 ± 72.9pg/ml
 (p < 0.05, Fig. 1). CNP
 5.6 ± 0.3pg/ml, 1 9.6 ± 2.7pg/ml,
 /ml, 4 7.0 ± 0.4pg/ml, 8 6.4 ± 0.4pg/ml
 1 가 (p < 0.05).
 7.8 ± 0.2pg/ml,
 1 8.6 ± 0.8pg/ml, 4 5.3 ± 0.3pg/ml,
 8 11.9 ± 1.3pg/ml 4
 8
 가 (p < 0.05,

Fig. 2).
 14.9 ± 0.3ng/ml/hr, 1
 12.8 ± 2.0ng/ml/hr, 4 9.8 ± 1.0ng/ml/

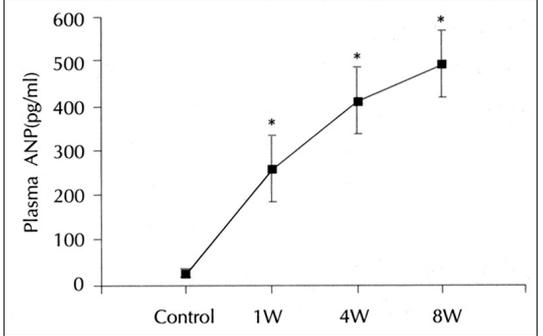


Fig. 1. Change of the plasma level of atrial natriuretic peptide (ANP) after myocardial infarction showing persistent elevation. *p < 0.05

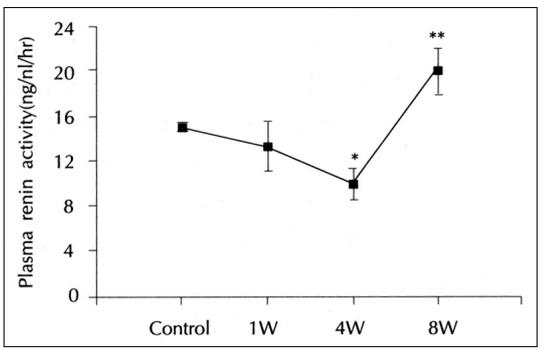


Fig. 2. Change of the plasma level of endothelin-1 after myocardial infarction showing decrease at 4th week (*p < 0.05) and increase at 8th week (**p < 0.05).

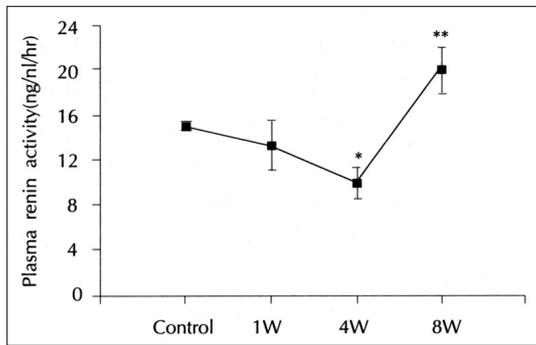


Fig. 3. Change of plasma renin activity after myocardial infarction showing significant decrease at 4th week (*p<0.05) and increase at 8th week (**p<0.05).

hr, 8 20.3 ± 1.8ng/ml/hr 4
8
가 (p<0.05, Fig. 3).

고 안

9,10,11)

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stress 가

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1, 4, 16

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22)

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15)

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