

관상동맥 스텐트 시술 후 심혈관계사건 발생예측에 있어 C-Reactive Protein의 역할

유희승 · 두영철 · 한상진 · 조구영 · 오동진 · 유규형 · 임종윤 · 이광학 · 이영

Predictive Value of C-Reactive Protein for Cardiac Events after Coronary Stenting

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ABSTRACT

Background and Objectives : Recent studies have implicated inflammation in the pathogenesis of coronary artery disease. The aim of this study was to determine whether C-reactive protein (CRP) levels are predictive of major adverse cardiac events (MACE) following stenting. **Subjects and Methods :** The study comprised 193 patients (90 men, 152 unstable angina, mean age 63 years) between October 1999 and March 2001. The patients were classified into 2 groups according to their MACE, [group A ; MACE (+), n = 46 and group B ; MACE (-), n = 147]. **Results :** During clinical follow-up at a mean duration of 15 months, there was 1 death, 7 myocardial infarctions, 25 cases of revascularization therapy, and 13 recurrent anginas. At 24 hours after stenting, the CRP levels were significantly higher in group A compared to group B (5.4, 0.6 -15.2 vs. 3.1, 0.1 -9.8 mg/L, respectively, $p < 0.01$), with the elevation of the CRP level (> 8.0 mg/L) occurring more commonly in group A than group B (24% vs. 9%, $p < 0.05$). The differences in the CRP levels between the baseline and 24 hours following stenting ($CRP_{24h-base}$) were also significantly higher in group A than in group B. After adjustment for age, sex, and cardiovascular risk factor, multi-variate analysis using logistic regression revealed the CRP levels 24 hours after stenting were predictive of MACE, with an odd ratio of 1.6 (95% CI 1.1 -2.2, $p = 0.01$). **Conclusion :** CRP levels, 24 hours following intervention, are powerful predictor of cardiac events in patients with stable or unstable angina undergoing coronary stenting. These results suggest that the inflammatory responsiveness to coronary intervention can play an important role in predicting cardiac events. (Korean Circulation J 2002;32(9):766-772)

KEY WORDS : Angioplasty, transluminal, percutaneous coronary ; Stents ; C-reactive protein.

서 론

가

, 1-5)

C - reactive pro-

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445

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tein(CRP) MACE .

.⁶⁻¹²⁾ .

(Percutaneous tr-
ansluminal coronary angioplasty : PTCA)

. CRP가

CRP 가
hemostatic system

CRP 가가

.¹⁰⁾ .

CRP
(major adverse co-
ronary event : MACE)

CRP

ACC/AHA classification type A, B1, B2, C
¹³⁾ (reference diame-
ter) (minimal luminal diame-
ter, MLD) QCA(quantitative computerized analy-
sis, Siemens ANCOR Version 2.3)

대상 및 방법

대상 환자

1999 10 2001 3

CRP

가 9 15% TIMI 3 flow
가 208 (5) (coron-
(5), 1 ary artery bypass graft : CABG)
(2), 15%
(3) 193 50%
(90 , 63±10 , 41 가
, 152) 가

MACE MACE가
(Group A, 46 , 24, 가
62±9) MACE가 (Group B,
147 , 66, 63±10)

SPSS 10.0 for Windows
 . CRP
 \pm , CRP
 (median) (,)
 . MACE
 chi - square test
 Mann - Whitney U test unpaired t -
 test
 odd ratio 95% confidence interval(CI)
 . Kaplan - Meier
 log - rank test
 . p 0.05

결 과

임상 및 혈관조영검사에서 특성

63 ± 10 , 가 90 (47%)
 . 61% 가 ,
 가 39%, 36% 31%
 . 79% Braun-
 wald IIB IIIB가 22% 48% .
 61% 가
 42% 가 . ACC/
 AHA type B2 43%, type C
 22% . 3.3
 mm, 17 mm,
 88% . 5%
 MLD 3.2 mm . 3.4 mm
 3 mm 가 84%
 19 mm, 20 mm 가 30% (Table 1).

주요심혈관계사건

15
 1 , 7 , 가
 가 25 ,
 13 46 가 .
 193 98 (51%)
 32 (33%)

Table 1. Clinical, angiographic and procedural characteristics

Patients (n = 193)	
Age (years)	63 \pm 10
Male (%)	90 (47)
Systemic hypertension (%)	118 (61)
Diabetes mellitus (%)	76 (39)
Hypercholesterolemia (%)	69 (36)
Smoking (%)	60 (31)
Stable angina (%)	41 (21)
Unstable angina (%)	152 (79)
Braunwald class IB/IIIB/IIIB	17/42/93
Multi-vessel disease (%)	118 (61)
Target lesion site	
Left anterior descending artery (%)	80 (42)
Left circumflex artery (%)	45 (23)
Right coronary artery (%)	68 (35)
ACC/AHA lesion classification	
Type A/B1/B2/C	4/45/83/61
Target lesion before stenting	
Reference diameter, mm	3.3 \pm 0.6
Percent stenosis (%)	88 \pm 11
Minimal luminal diameter, mm	0.4 \pm 0.3
Lesion length, mm	17.3 \pm 5.3
Target lesion after stenting	
Percent stenosis (%)	5 \pm 3
Minimal luminal diameter, mm	3.2 \pm 0.6
Acute gain, mm	2.8 \pm 0.6
Stent size, n (%)	3.0/<3.0 mm 162 (84)/ 31 (16)
Stent length, n (%)	20/<20 mm 58 (30)/135 (70)
ACC/AHA : American College of Cardiology/American Heart Association	

25 (26%,
 PTCA 20 , CABG 5) .

주요심혈관계사건의 예측인자

MACE가 CRP
 , CRP
 6 , 72 CRP 가
 , 24 CRP MACE가
 (group A) (group B)
 5.40(0.64~15.2) mg/L 3.10(0.06~9.80)
 mg/L group A (p<0.01)(Table

2)(Fig. 1). 24 CRP 8 mg/L group A 11 (24%), group B 13 (9%) group A (p<0.05). MACE

24 CRP 3.30(1.0~11.3) mg/L 1.10(-2.0~3.8) mg/ (p=0.002), MLD(p=0.001), acute gain(0.004), 24 CRP (p=0.009), 24 CRP (p=0.001)가 MACE

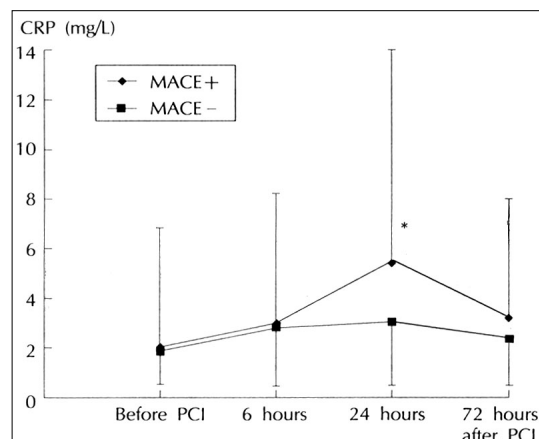


Fig. 1. Trends of CRP levels (mg/L, median and range) in patients with MACE (major adverse coronary event) and without MACE. * : p<0.01 vs. MACE (-), PCI : percutaneous coronary intervention

(p<0.01)(Table 2). group A (p=0.002), MLD(p=0.001), acute gain(0.004), 24 CRP (p=0.009), 24 CRP (p=0.001)가 MACE

(OR 1.2, CI 1.1~1.4, p<0.05) 24 CRP (OR 1.6, CI 1.1~2.2, p<0.01) MACE (Table 3).

24 CRP plan - Meier survival curve 10 CRP가 4 mg/L (p<0.001)

(Fig. 2).

Table 2. Baseline CRP and CRP changes in patients with MACE (major adverse coronary event) and without MACE (median, minimum to maximum)

	MACE (+) n = 46	MACE (-) n = 147	p
CRP levels (mg/L)			
On admission	2.05 (0.06 - 7.00)	1.95 (0.06 - 3.41)	NS
6 hours after stenting	3.19 (0.06 - 8.00)	2.87 (0.06 - 6.00)	NS
24 hours after stenting	5.40 (1.64 - 15.2)	3.10 (0.06 - 9.80)	<0.01
72 hours after stenting	3.20 (1.00 - 7.87)	2.50 (0.06 - 4.70)	NS
CRP (24 hrs-base)	3.30 (1.0 - 11.3)	1.10 (- 2.0 - 3.8)	<0.01
CRP (72 hrs-base)	1.10 (- 2.0 - 7.0)	0.60 (- 1.0 - 4.0)	NS

CRP (24 or 72 hrs-base) : differences of CRP levels between baseline and 24 or 72 hours after stenting, NS : not significant, CRP : C-reactive protein

Table 3. Logistic regression analysis for major adverse coronary event

	Uni-variate p	Multi-variate analysis			
		OR	95% CI	P	
Reference diameter (mm)	0.002	0.7	0.1, 2.3	0.39	
Post-stenting MLD (mm)	0.001	0.8	0.1, 2.7	0.24	
Post-stenting PS (%)	0.02	1.2	1.1, 1.4	0.04	
Acute gain (mm)	0.004	0.8	0.1, 5.7	0.29	
CRP levels (24 hrs after stenting)	0.009	1.6	1.1, 2.2	0.01	
CRP (24hrs-base)	0.001	1.5	0.9, 1.7	0.62	

MLD : minimal luminal diameter, PS : percent stenosis, OR : odd ratio, CI : confidence interval, CRP (24hrs-base) : differences of CRP levels between baseline and 24 hours after stenting, CRP : C-reactive protein

가 (group A, 46 , 24, 62±9) MACE가 (group B, 147 , 66 , 63±10) MACE .

CRP ,

가 6 , 24 , 72 .

가

결 과 :

15

1 , 7 , 가

가 25 ,

13 46 가 .

193 98 (51%)

32 (33%)

25 (26%,

PTCA 20 , CABG 5) . 24

CRP group A B 5.40(0.64~15.2)

mg/L 3.10(0.06~9.80) mg/L group A

(p<0.01)(Table 2).

24 CRP CRP

3.30(1.0~11.3) mg/L 1.10(- 2.0~3.8) mg/

L group A (p<

0.01). MACE

CRP (p=0.002),

(p=0.02), acute gain

배경 및 목적 : (p=0.004) MACE

가 (OR 1.2, CI 1.1~1.4, p<

0.05) 24 CRP (OR 1.6, CI

1.1~2.2, p<0.01) MACE

CRP 24 CRP

(major adverse coronary event : Kaplan - Meier survival curve 10

MACE) 24 CRP

CRP 가 4 mg/L

방 법 : (p<0.001).

1999 10 2001 3

결 론 :

CRP CRP가

9 ,

193 (90 , 63±10 , 24 CRP 가

152) MACE . 가

중심 단어 : ; C - reactive protein.

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