

## 관상동맥 성형술 후 발생하는 비Q파 심근경색이 심장에 미치는 장기적 영향

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### Impact on Long-term Adverse Cardiac Events of Troponin T or Creatine Kinase-MB Release after Percutaneous Transluminal Coronary Angioplasty

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#### ABSTRACT

**Background and Objectives :** The impact on long-term adverse cardiac events of troponin T (TnT) or creatine kinase-MB (CK-MB) release after percutaneous transluminal coronary angioplasty (PTCA) is not well defined. The purpose of the study is to evaluate the effect of elevated TnT or CK-MB on the late major adverse cardiac events [MACE ; Q wave myocardial infarction (MI), revascularization, or cardiac death]. **Subjects and Methods :** Study population were 207 consecutive patients (M : F = 148 : 59, mean 60.8 ± 9.2 years) who underwent PTCA. Patients with acute MI, unstable angina with abnormal levels of TnT or CK-MB, or newly developed Q MI after PTCA were excluded. Cardiac enzyme levels were measured before and 8, 24 hours after PTCA for CK-MB, and before and 16 hours after PTCA for TnT. Group I (n = 181, 87.4%) had normal levels of both after PTCA. Group II (n = 26, 12.6%) had abnormal levels of CK-MB ( > 16 U/L) and/or TnT ( > 0.2 ng/mL). 1-year follow-up was available in 201 (97.1%) patients. **Results :** Incidence of non-Q MI after PTCA was 26/207 (12.6%). Major complications such as acute coronary occlusion, side branch occlusion, and major dissection were significantly associated with elevation of TnT or CK-MB after PTCA (p = 0.01). However, elevation of CK-MB or TnT was not significantly associated with late MACE by Kaplan-Meier survival curve (p = 0.46). During 1-year follow-up, event free rate of group I and II were 76.6% and 69.2%, respectively. **Conclusion :** Acute coronary occlusion, side branch occlusion, or major dissection can increase the level of TnT or CK-MB after PTCA. But, elevation of CK-MB or TnT after PTCA does not

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significantly influence on late MACE. (Korean Circulation J 2002;32(11):949-957)

**KEY WORDS :** Angioplasty, transluminal, percutaneous coronary ; Creatine kinase ; Myocardial infarction ; Troponin T.

## 서론

207  
(n = 181, 87.4%)  
CK - MB troponin T가  
(n = 26, 12.6%)  
CK - MB troponin T가  
Q  
가  
가  
creatine kinase creatine kinase isoenzyme MB(CK - MB) troponin T troponin  
가 Troponin CK CK - MB  
CK - MB  
Q  
가  
CK CK - MB  
troponin T  
Q  
CK - MB  
Q  
Q  
1  
Q

## 대상 및 방법

대 상

가 가  
Q

## 심근 효소의 측정 및 분석

CK - MB troponin T  
CK - MB 8 , 24  
immune inhibition(Johnson & Johnson Clinical Diagnostics, USA)  
troponin T 16 enzyme - immunological test(Boehringer Mannheim Diagnostics, Germany)  
CK - MB 16 U/L , troponin T 0.2 ng/mL

## 심전도 검사 및 분석

12  
24  
2

## 관상동맥 조영술 및 성형술

Judkins 가 A  
A AHA/ACC A  
AHA/ACC  
B C

TIMI(Thrombolysis in Myocardial Infarction) 0, 1, 2

(major dissection), (minor dissection),  
 , 가 , ,  
 NHLBI(National Heart, Lung  
 and Blood Institute) A  
 B , C, D, E, F  
 MI 3 TIMI 0 1

**Table 1.** Clinical demographics

	Group I	Group II	p
Number	181 (87.4%)	26 (12.6%)	
Age (years)	59.1 ± 9.5	64.3 ± 7.9	NS*
Male	131 (62.6%)	17 (65.4%)	NS
Risk factors			
Smoking	100 (55.2%)	16 (57.1%)	NS
Diabetes mellitus	41 (22.6%)	5 (17.8%)	NS
Hypertension	81 (44.7%)	18 (64.3%)	NS
Hyperlipidemia	51 (28.2%)	7 (25.0%)	NS

\* : not significant

주적 관찰  
 가 1  
 , 1  
 Q  
 CK - MB가  
 2 Q 가  
 ,  
 가  
 .  
 1 ),  
 .

가 59 (28.5%), 가  
 79 (38.2%), 가 69 (33.3%)  
 , , ,  
 가  
 (Table 1).

#### 관상동맥 성형술 후 비Q파 심근경색의 발생 빈도

Q 2  
 28/209 (13.4%)  
 Q 2  
 207 Q 26 (12.6%)  
 Q  
 (26/28, 93%)

통 계 ± ,  
 SPSS Chi - square  
 test, Fisher 's exact test, Student 's t - test mu-  
 ltivariate analysis ,  
 Kaplan -  
 Meier survival curve  
 p 0.05 .

#### 원인 인자에 따른 비Q파 심근경색 발생의 비교

#### 진단 및 치료 방법에 따른 비Q파 심근경색 발생의 비교

,  
 79/207 (38.2%) 12 (15.2%),  
 69/207 (33.2%) 8 (11.6%)

결 과  
 대상 환자들의 임상적 특성  
 207 / 148/59  
 59.1 ± 9.5 , 64.3 ± 7.9

Q ,  
 Q 가 ,  
 142/207 (68.6%) 17  
 (11.0%) , 65/207  
 (31.4%) 9 (13.8%) Q  
 Q  
 가 (Table 2).

**Table 2.** Incidence of newly developed non Q myocardial infarction (MI) after percutaneous transluminal coronary angioplasty in each characteristics\*

	Total	Group I	Group II
Diagnosis			
Old MI	59 (28.5%)	53 (90.0%)	6 (10.0%)
Unstable angina	79 (38.2%)	67 (84.8%)	12 (15.2%)
Stable angina	69 (33.2%)	61 (88.4%)	8 (11.6%)
Treatment modality			
Balloon	142 (68.6%)	125 (89.0%)	17 (11.0%)
Stent	65 (31.4%)	56 (86.2%)	9 (13.8%)
Lesion			
Type A	101 (48.7%)	89 (88.1%)	12 (11.9%)
Irregular	61 (29.5%)	54 (89.0%)	7 (11.0%)
Total/subtotal	32 (15.4%)	26 (82.0%)	6 (18.0%)
Thrombus	10 ( 4.8%)	9 (90.0%)	1 (10.0%)
SVG	3 ( 1.5%)	3 (100%)	0 ( 0%)

\* : no significant difference between each characteristics, SVG : saphenous vein graft

#### 병변에 따른 비Q파 심근경색 발생의 비교

	A	Q
	101/207 (48.7%)	
	12 (11.9%),	61/207 (29.5%)
	7 (11.0%),	32/207
	(15.4%)	6 (18.0%),
	10/209	
	(4.8%)	1 (10.0%)
	Q	
	3/207 (1.5%)	
	Q	
	Q	
	가	

#### 합병증에 따른 비Q파 심근경색 발생의 비교

	가	Q
	100/207 (48.3%)	가
	(92/207, 44.4%)	
	Q	
	가	Q
	Q	
	( 1.6% vs. 11.5%	
	[p=0.02], 2.2% vs. 11.5% [p=0.04]).	
	가	
	Q	Q

**Table 3.** Incidence of newly developed non Q myocardial infarction after percutaneous transluminal coronary angioplasty in each complication group

Complications	Group I	Group II	Odds ratio	p
No complication	92	8		0.04
Acute occlusion	3	3	7.74	0.02
Side br. occlusion	4	3	5.77	0.04
Thrombus	4	0	1.35	1.0
Minor dissection	68	10	1.04	1.0
Major dissection	12	2	1.17	0.69

(p=0.01).  
Q  
Q  
(p=0.04)(Table 3).

#### CK-MB와 troponin T의 분포, 예민도 및 관상동맥 성형술 후 발생하는 비Q파 심근경색의 독립인자

CK - MB	troponin T
Q	CK - MB
1~14 U/L( 3 U/L), troponin T	0.01~0.19
ng/mL( 0.04 ng/mL)	, Q
CK - MB	16~175 U/L,
troponin T	0.20~2.72 ng/mL
, Q	26
troponin T	가 11 , CK - MB
가 troponin T가	2 , CK -
MB가 troponin T가	13
	Q
CK - MB	troponin T
50.0%(13/26), 92.3%(24/26) , troponin T가 CK -	
MB	
Q	(p=0.03)
(p=0.01)	

#### 주적 관찰

	207	201
	1	
	(Q	, , )가
		. 1

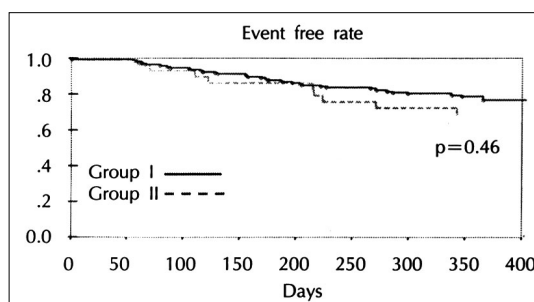
49/201 free rate) 152/201 (75.6%) Q  
(24.4%) Q  
(30.8% vs. 23.4%, p=0.46). (69.2% vs. 76.6%, p=0.46)  
(Table 4, Fig. 1).

Q Q 고 찰  
Q 1 Q  
48/201 (23.8%) 가 1 Q  
Q 가  
(30.8% vs. 22.8%, p=0.46). Q  
3  
45/48 (93.8%)  
1 (event -  
가

**Table 4.** Incidence of late major adverse cardiac events (MACE) after percutaneous transluminal coronary angioplasty (PTCA) in group I and group II\*

	Group I	Group II	Total
PTCA	37 (21.1%)	8 (30.8%)	45 (22.4%)
CABG	3 ( 1.7%)	0 ( 0.0%)	3 ( 1.5%)
MI	1 ( 0.5%)	0 ( 0.0%)	1 ( 0.5%)
Death	0 ( 0.0%)	0 ( 0.0%)	0 ( 0.0%)
MACE	41 (23.4%)	8 (30.8%)	49 (24.4%)
Event free rate	134 (76.6%)	18 (69.2%)	152 (75.6%)

\* : no significant difference between group I and group II, CABG : coronary artery bypass graft, MI : myocardial infarction



**Fig. 1.** Event free rate in group I and group II. During 1-year follow-up, event free rate of group I and II were 76.6% and 69.2%, respectively. Elevation of CK-MB or troponin T was not significantly associated with major adverse cardiac events (p=0.46).

5)  
1)  
, 2)  
, 3)  
, 4)  
, 5)  
, 6)  
serum glutamate oxaloacetate transaminase(SGOT ; aspartate transaminase, AST)  
lactate dehydrogenase(LDH) LDH isoenzyme

CK CK - MB, troponin T, troponin

CK-MB 및 troponin T의 특성

CK - MB 가  
3~8 가  
12~24 2~3  
CK - MB  
92%  
100% 7) CK - MB가

가 8~20%<sup>1-4)</sup> nin CK - MB troponin

CK CK - MB가 troponin T가<sup>8)9)</sup> CK - MB troponin<sup>15)16)</sup> troponin T가 CK - MB<sup>10)</sup> troponin T가 7, 5, 0.5%<sup>13) Karim 15)</sup> troponin T가 가 CK - MB

가 가 troponin T가 Ravkilde<sup>4)</sup> troponin T가

2~3 2 troponin T 3~8 13% troponin T troponin T 5~14 12 ~2<sup>6)</sup> Troponin T 93% 100%<sup>17)</sup>

troponin T en- CK - MB troponin T zyme immunoassay<sup>13)</sup> 0.5% 28/209 (13.4%)

관상동맥 성형술 후 비Q파 심근경색의 진단 Q 26/209(12.6%) Q Q 93%(26/28)

CK - MB troponin 가 CK - MB 2~5 비Q파 심근경색 발생의 관련 인자 troponin T 가 0.04 ng/mL 가 0.2 ng/mL<sup>14)</sup> 가 가<sup>16)18)</sup> CK - MB Q Q CK - MB 가 Q ponin T (16 IU/L ) , tro- 가 가 ponin T 0.2 ng/mL 가 가 ( ) 가 CK - MB

Q  
 chia<sup>19)</sup> 19 (11.0% vs. 16.0%). La Vec-  
 25 . Abdelmeguid<sup>24)</sup> CK  
 CK - MB  
 36  
 CK -  
 (37% vs. 14%), CK - MB MB가 가 ( p=0.03,  
 (p=0.004). , 가 p=0.02), CK - MB가  
 가  
 가 ( p=0.11, p=0.05).  
 ( , , ) CK -  
 MB가 가 가 (p  
 =0.009).  
 Q  
 가 . Alexander<sup>25)</sup> CK  
 CK - MB  
 6  
 CK - MB 3  
 가 6 가  
 (p=0.001). Bertinchant<sup>26)</sup> CK - MB,  
 troponin T troponin  
 가  
 11 , , ,  
 troponin T  
 가 . Fuchs<sup>27)</sup>  
 troponin 가 0.45 ng/mL  
 가 ,  
 , Q ,  
 8  
 0.45 ng/mL  
 가 (p=0.3). CK -  
 MB troponin T troponin  
 T (p=0.625).  
 CK CK - MB  
 가 troponin  
 troponin T가 가  
 (p=0.04).  
 Q  
 (p=0.01),  
 (p=0.02), 가 (p=0.04)  
 CK - MB  
 troponin T가 가  
 (p=0.04).

관상동맥 성형술 후 발생하는 비Q파 심근경색이 장기적으로 심장의 부정적 결과에 미치는 영향

Q , Q

troponin T troponin  
가 .

**요 약**

**배경 및 목적 :** 가  
8~20% ,  
Q , Q  
가 .  
Q  
Q

**방 법 :**

가 가  
Q  
207  
CK - MB troponin T  
, CK - MB  
8 , 24 , troponin T  
16  
(n = 181, 87.4%) CK - MB  
troponin T가 ,  
(n = 26, 12.6%) CK - MB  
troponin T가 (CK - MB16  
U/L, troponin T 0.2 ng/mL) . 1  
,  
(Q , ,  
)  
**결 과 :**  
207 26 (12.6%) Q  
가 , Q  
(p = 0.01).  
Q

(p = 0.03) (p  
= 0.01) . 1 Q  
Kaplan -  
Meier survival curve  
가 (p = 0.46).  
가  
(event - free rate) Q  
69.2% 76.6% .

**결 론 :**  
, 가  
Q  
Q  
Q

**중심 단어 :** ; ;  
; T.

**감사문** \_\_\_\_\_

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