

급성 심근경색증에 대한 일차 관상동맥 중재술중 투여한 압시씨맵(Abciximab)의 관상동맥 혈류개선효과에 대한 분석

- 교정 TIMI Frame 계산법을 이용하여 -

가

정해역 · 승기배 · 장정원 · 김용주 · 임상현 · 김태균 · 장기욱
임효영 · 정육성 · 김종진 · 채장성 · 김재형 · 홍순조 · 최규보

Assessment of the Change of Coronary Artery Flow Using Corrected TIMI Frame Count Following Abciximab Administration during Primary Angioplasty for Acute Myocardial Infarction

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ABSTRACT

Background : In spite of the successful reperfusion therapy, coronary blood flow in infarcted myocardium was known to decrease for a long time. Abciximab is known to inhibit the final pathway of platelet aggregation and maintenance the large vessel patency. But abciximab may have another important effect beyond the these effect. TIMI frame count method is simple, reproducible, objective and quantitative index of coronary flow. We tried to define the effect of abciximab that used with primary angioplasty on the coronary blood flow using TIMI frame count methods. **Methods :** We consecutively studied 30 patients who admitted for acute myocardial infarction without cardiogenic shock from September 1997 to August 1999. We analyzed the changes of corrected TIMI frame count (CTFC) between the baseline (immediate after the angioplasty) and follow-up (post-op 7th day) coronary angiogram and compared the results between the group of primary angioplasty with abciximab (abciximab group, n = 11) and the group of primary angioplasty without abciximab (non-abciximab group, n = 19). **Results :** There were no differences between abciximab group and non-abciximab group in baseline characteristics, treatment modalities and angiographic results. According to the results of the comparison of CTFC, changing rate of CTFC, velocity and changing rate of velocity, there were significant improvement of the coronary blood flow in infarct related artery in the abciximab group than non-abciximab group. But there were no differences in the changes of coronary blood flow in non-infarct related artery between two groups. The frequency of major adverse coronary events during follow up periods (mean 6 months) were similar (9.1% and 5.2% each other, p>0.05). **Conclusions :** Abciximab used with primary angioplasty in

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acute myocardial infarction improved the coronary blood flow significantly in infarcted myocardium. This finding may be related that abciximab enhance the perfusion and function of microvasculature in infarcted myocardium. (**Korean Circulation J 2000;30(7):803-810**)

KEY WORDS : TIMI frame count · Coronary blood flow · Abciximab · Primary angioplasty · Acute myocardial infarction.

TIMI frame

서 론

대상 및 방법

30 45% 대상환자
(micr - 1997 9 1999 9

ovasulature) 가 12

¹⁾²⁾ 가

(abciximab) 1998 RAPPORT 45

³⁾⁴⁾ (no reflow phenomenon) TIMI 3 가

7

7 TIMI frame 가

(epicardial coronary artery) 30

(patency) ,

압시씨맵(Reo-pro™)

TIMI (flow grading system) (,)가 가

0 3 ,

TIMI 11

(qualitative) TIMI kg 0.25 mg ,

1 2 가 , 10 µg 12

(categorical) 250 mg,

⁵⁾ TIMI frame 500 mg, kg 70

가 (19)

250 mg, 500 mg, kg 100 120

(cineangiog -

ram) frame()

TIMI frame 계산법 및 분석

가

⁶⁾ (cineangio -

gram) frame() ⁶⁾

(cineangiogram) 30 frame
(7Fr)

Hexabrix™가 TIMI
(corrected TIMI frame count)
가
가
1.7 Frame

TIMI frame 계산법의 변이성(variability)

10
가 3.5±2.5, core lab
가 0.9±4.8 TIMI frame
7)

분석의 목표

7
frame

통 계

0.05

결 과

30 가
() 11 ,
() 19

Table 1. Comparison of baseline clinical characteristics

| | Abciximab group (n = 11) | Non-abciximab group (n = 19) |
|---------------------------|--------------------------|------------------------------|
| Age (mean ± SD) | 53.7 ± 11.6 | 60.3 ± 9.9 |
| Male sex (%) | 63.6 | 68.4 |
| HBP (%) | 27.2 | 36.8 |
| DM (%) | 18.2 | 21.1 |
| Smoking (%) | 45.5 | 31.6 |
| Hypercholesterolemia (%)* | 18.2 | 26.3 |
| IRA | | |
| RCA (%) | 33.3 | 57.9 |
| LAD (%) | 45.5 | 21.6 |
| EF (%) | 53.5 | 56.0 |

EF : ejection fraction

IRA : infarct related artery

LAD : left anterior descending artery

RCA : right coronary artery

*Hypercholesterolemia : serum cholesterol 240 mg/dl

Table 2. Comparison of modalities that used during primary angioplasty

| | Abciximab group (n = 11) | Non-abciximab group (n = 19) |
|-------------------------|--------------------------|------------------------------|
| Stenting (%) | 10 (90.9) | 13 (68.4) |
| Balloon angioplasty (%) | 1 (9.1) | 6 (31.6) |

53.5%

56.0% (Table 1).

7 1 ,
6 23
10 , 13 가
(9.1% vs 31.6%, p=0.25,
90.9% vs 68.4%, p=0.6)(Table 2).

(quantitative
coronary analysis, QCA)

T (reference diameter) 3.4
mm 3.1 mm , (percent diameter
stenosis) 93.9% 97.4% ,
(minimal luminal diameter, MLD) 0.2 mm
0.8 mm . 3.0 mm
2.8 mm , 7
3.1 mm 2.8 mm
가 (Table 3).

TIMI frame (CTFC) 7

CTFC (Changing Rate of CTFC) 3.8 ± 5.0 ($p=0.01$, Fig. 1A).
 CTFC (差) 14.7 ± 12.3 , $13.0 \pm 19.8\%$
 $35.8 \pm 21.8\%$, CTFC 가 ($p=0.002$, Fig. 1B). CTFC
 (1/CTFC) (velocity) 가 .
 (1/CTFC) (velocity) 가 .

Table 3. Comparison of quantitative coronary angiographic results

| | Abciximab group (n=11) | Non-abciximab group (n=19) |
|-------------------------------|------------------------|----------------------------|
| Reference diameter | 3.4 ± 0.4 | 3.1 ± 0.5 |
| % Diameter stenosis | 93.9 ± 9.9 | 97.4 ± 5.4 |
| Minimal luminal diameter | 0.2 ± 0.3 | 0.8 ± 0.2 |
| Post-% diameter stenosis | 11.7 ± 10.3 | 10.5 ± 10.1 |
| Post-minimal luminal diameter | 3.0 ± 0.5 | 2.8 ± 0.6 |
| Acute gain | 2.8 ± 0.6 | 2.7 ± 0.6 |
| FU-% diameter stenosis | 8.6 ± 8.7 | 8.4 ± 8.0 |
| FU-minimal luminal diameter | 3.1 ± 0.5 | 2.8 ± 0.6 |
| Late loss | -0.1 ± 0.13 | -0.05 ± 0.2 |
| Net gain | 2.9 ± 0.6 | 2.7 ± 0.6 |

Data are expressed as mean \pm SD FU : follow up

2.3 ± 2.3 , 0.7 ± 1.0 ($p=0.003$, Fig. 2A).
 (Changing Rate of Velocity) $180 \pm 190\%$, $120 \pm 20\%$ 가 가 ($p=0.02$, Fig. 2B).
 CTFC -0.48 ± 11.4 5.3 ± 5.7 , CTFC $101.7 \pm 33.3\%$ $88.4 \pm 16.4\%$ 가 (p 0.2 0.3), velocity (changing rate of velocity) 가 ($p>0.05$, Fig. 3A and B).
 6 (ma -

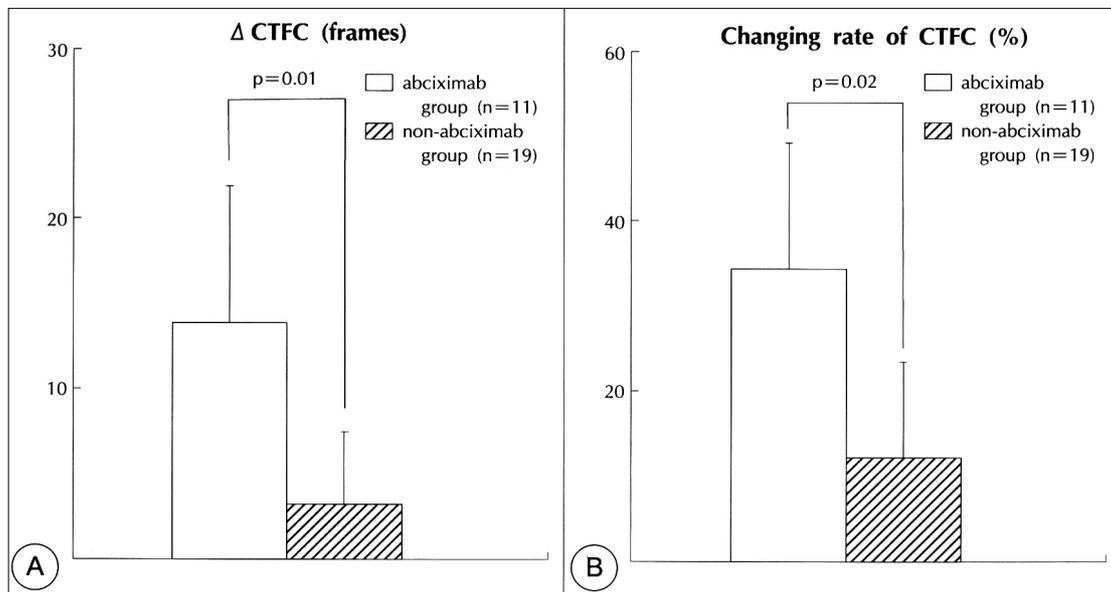


Fig. 1. Comparison of CTFC (A) and changing rate of CTFC (B) in infarct related artery between abciximab group and non-abciximab group. Data are expressed as mean \pm SD. CTFC = CTFC_{base} - CTFC_{7day}. Changing rate of CTFC = (CTFC_{base} - CTFC_{7day})/CTFC_{base} \times 100.

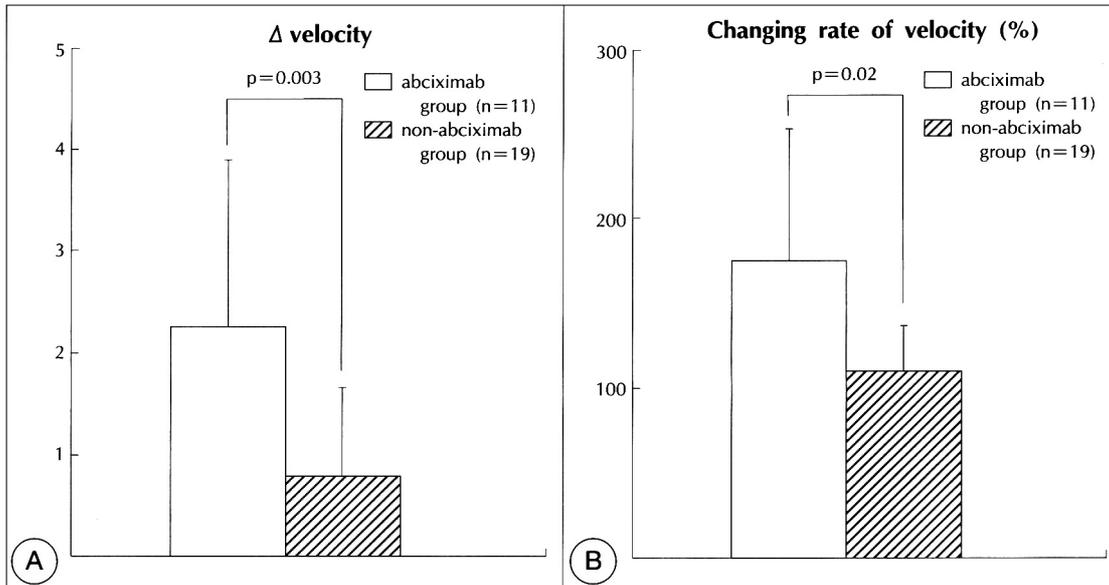


Fig. 2. Comparison of velocity (A) and changing rate of velocity (B) in infarct related artery between abciximab group and non-abciximab group. Data are expressed as mean \pm SD. $\text{velocity} = (1/\text{CTFC}_{7\text{day}}) - (1/\text{CTFC}_{\text{base}})$. Changing rate of velocity = $\text{velocity}_{7\text{day}}/\text{velocity}_{\text{base}} \times 100$.

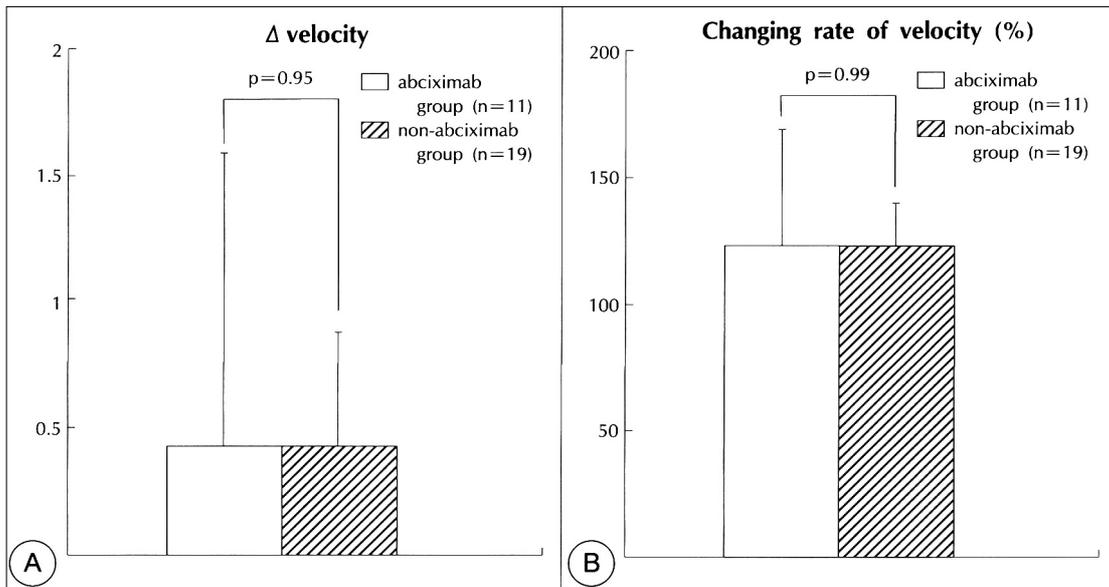


Fig. 3. Comparison of velocity (A) and changing rate of velocity (B) in non-infarct related artery between abciximab group and non-abciximab group.

for adverse coronary events, MACE)

가 1 (9.1% vs 5.2%) 가 ($p > 0.05$, Table 4).

고찰

coronary artery), (epicardial

Table 4. Comparison of major adverse coronary events during follow up period (mean 6 months)

| | Abciximab group (n = 11) | Non-abciximab group (n = 19) |
|-----------------------|-----------------------------|---------------------------------|
| Death | 0 | 0 |
| Myocardial infarction | 0 | 0 |
| TVR | 1 | 1 |
| Total (%) | 1 (9) | 1 (5.2) |

TVR : target vessel revascularization

(distal run - off) ⁸⁾

30 45%

(neurohormone)

(A2, 가,

(microvasculature)

³⁾

TIMI (flow grading system)

0 3
TIMI GUSTO
TIMI

, TIMI 3 ¹⁰⁾ TIMI

(qualitative) TIMI 1
2 가 , ⁵⁾

TIMI frame 가

(cine - angiogram) frame

⁶⁾ 1999 Gibson

90
가
가
TIMI 3
가
TIMI frame
TIMI frame 가
TIMI frame ⁶⁾
TIMI frame ¹¹⁾
TIMI frame ¹²⁾
7
TIMI 10B, 14
frame ¹³⁾¹⁴⁾
(Doppler wire method) ¹⁵⁾
가
TIMI 3
(microvasculature) ¹⁶⁾
3가
(Glycoprotein) b/ a 가

vitronectin
(reperfusion injury)
6

TIMI 3 가

Mac - 1
가
14)17)

24
TIMI frame
가

TIMI frame

가 가

9)가

가 가 가

가 ,
diameter), (acute gain),
가
가
(minimal lumen diameter), (diameter stenosis), (late loss)

가
11 , 19
가
가

요 약

연구배경 및 목적 :

TIMI
TIMI frame

대상 및 방법 :

12
TIMI 3 가
7
frame 가 30 (11) TIMI (19)

TIMI frame 7
TIMI frame

결 과 :

1) ()
()
가
2) CTFC, CTFC , velocity, (velocity)
7

(CTFC ; p=0.01,
CTFC ; p=0.02, velocity ; p=0.003,
; p=0.02).

3)

가 (CTFC ; p=0.2, CTFC ; p=0.3, velocity ; p=0.95, ; p=0.99).

4)

9.1%, 5.2% 가 (p>0.05).

결론 :

중심 단어 : TIMI frame

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