

관상동맥 중재술 후 제2차 재협착에 관여하는 인자

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Risk Factors for the Second Restenosis after Coronary Interventions

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ABSTRACT

Background and Objectives : One of the major limitations in coronary intervention is restenosis. This study was aimed to identify clinical, angiographic and procedural factors, which may be related to the second restenosis (SR). **Materials and Method** : We studied 101 patients who underwent more than two follow-up coronary angiograms after two coronary interventions between Jan 1996 and Dec 1998 in Chonnam University Hospital (out of 4092 total coronary interventions in 3030 patients during the same period). The patients were divided into two groups according to the evidence of second restenosis (SR). Fifty two patients (Group A : 56.6 ± 9.9 year, M : F = 44 : 8) who had SR, and the other 49 patients (Group B : 53.8 ± 8.5 year, M : F = 44 : 5) were analyzed. Clinical features, angiographic characteristics, coronary interventional procedures, and other risk factors were compared between two groups by univariate analysis and multivariate stepwise logistic regression analysis for the predictive factors of second restenosis. **Results** : 1) The clinical variables of age, sex, clinical diagnosis, and risk factors were not different between two groups. 2) The lesion types severer than B₂ by AHA/ACC classification were associated with SR (p < 0.05). 3) Recurrent angina as an indication for follow up angiography was associated with SR (p < 0.01). **Conclusion** : The predictive factors associated with SR were patient's subjective symptom and lesion severer than type B₂ according to AHA/ACC classification. (Korean Circulation J 1999;29(6):550-559)

KEY WORDS : Second restenosis · Coronary intervention.

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서 론

2

1

2

가 가 ,
(percu -
taneous transluminal coronary angioplasty : PTCA)
1977 Andreas Grntzig

대상 및 방법

대상 환자

가 .¹⁾²⁾

1996 1 1998 12

4,092 ,

3030 1 , 2

가

가

101

가

2 52 (A ; 56,6

± 9.9 , : =44 : 8) 2

.³⁻⁶⁾

49 (B ; 53.8 ± 8.5 , : =44 : 5)

(mechanical therapy)

가 , , ,

porous balloon catheter

, polymeric

관상동맥 조영술 소견

implant

(local drug delivery), ,

AHA/ACC

, TIMI(Thrombolysis In Myocardial

Infarction) flow

(anti - sense therapy), ,

gamma beta

AHA/ACC

A

(local radiation therapy)

10 mm

45 °

, B₁

10 20 mm

, 45 °

3

C

.⁷⁻¹²⁾

20 mm

20 mm

3

, 60 °

(>45 °),

, B₂

B₁

30%

.⁶⁾

(>20 mm), electric caliper

관상동맥 중재술 시술 50% (angiographic re-stenosis) 2

(univariate analysis) (categorical variables) ²-test Fisher's exact test

Monorail (continuous variables) \pm Student t-test Mann-Whitney test

35%

nitrate, (heparin 150 U/kg, 10,000) 24 aspirin \pm p-value

200 mg/day, ticlopidine 500 mg/day 0.05 가

결 과

추적관상동맥 조영술

6 1996

1 1998 12

3,030 492 (16.2%)

119 (3.9%)

가 101

가

임상적인 특징

11 (Group A : B = 7 :

4), 36 (Group A : B = 18 : 18),

43 (Group A : B = 20 : 23),

11 (Group A : B = 7 : 4)

Table 1. Clinical characteristics of the patients with second restenosis (Group A) and without second restenosis (Group B)

	Group A (n = 52)	Group B (n = 49)	p value
Age	56.6 \pm 9.9	53.8 \pm 8.5	NS
Sex (M : F)	44 : 8	44 : 5	NS
Diagnosis			
Stable angina	7 (13.5%)	4 (8.2%)	NS
Unstable angina	18 (34.6%)	18 (36.7%)	NS
Acute MI	20 (38.5%)	23 (46.9%)	NS
Old MI	7 (13.5%)	4 (8.2%)	NS
Risk factors			
Family history	2 (3.8%)	5 (10.2%)	NS
Diabetes	14 (26.9%)	7 (14.3%)	NS
Hypertension	26 (50%)	26 (53.1%)	NS
Smoking	38 (73.1%)	36 (73.5%)	NS
Hyperlipidemia	30 (57.7%)	28 (57.1%)	NS

*MI : myocardial infarction

자료의 분석 및 통계처리

AHA/ACC

TIMI(Thrombolysis In Myocardial infarction) flow

관상동맥조영술 소견

가 A 17
(32.7%), 22 (43.2%), 13
(25%), B 30 (61.2%),
13 (26.5%), 6 (12.2%)
A 68.2%, B
38.78 % A (p<0.05).
40% A 32
7 (15.6%), B 2 (4.8%) (61.5%), 8 (15.4%), 12
A 199± (23.1%), B 31
34, 128±33, Apo B 105±27, (63.3%), 10 (20.4%), 8
Lipoprotein(a) 38±36 mg/dl, B (16.3%) 가
216 ±47, 145±43, 122±32, 30±29 mg/dl (Table 2).

Table 2. Anigiographic characteristics in patients with second restenosis (Group A) and without second restenosis (Group B)

	Group A (n = 52)	Group B (n = 49)	p value
Vessel number			<0.05
One vessel disease	17(32.7%)	30(61.2%)	
Two vessel disease	22(43.2%)	13(26.5%)	
Three vessel disease	13(25%)	6(12.2%)	
Target lesion			NS
Proximal	9(17.3%)	12(24.5%)	
LAD Middle	19(36.5%)	15(30.6%)	
Distal	1(1.9%)	4(8.2%)	
LCX Proximal	5(9.6%)	8(16.3%)	
Distal	2(3.8%)	2(2%)	
Obtuse marginal	1(1.9%)	0(0%)	
Intermediate	3(5.8%)	0(0%)	
Proximal	4(7.7%)	1(2%)	
RCA Middle	3(5.8%)	6(12.2%)	
Distal	5(9.6%)	1(2%)	

*LAD : left anterior descending artery, LCX : left circumflex artery, RCA : right coronary artery

Table 3. Angiographic morphology by AHA/ACC classification in patients with second restenosis (Group A) and without second restenosis (Group B)

		Type			
		A	B1	B2	C
Group A (n = 52)	First restenosis	2 (3.8%)	16 (30.8%)	17 (32.7%)*	17 (32.7%)*
	Second restenosis	2 (3.8%)	13 (25%)	20 (38.5%)	17 (32.7%)
Group B (n = 49)	First restenosis	7 (14.3%)	29 (59.2%)	5 (10.2%)	8 (16.3%)
	Second restenosis	2 (5.1%)	17 (43.6%)	11 (28.2%)	9 (23.1%)

*p<0.05

Table 4. Morphologic characteristics by angiography in patients with second restenosis (Group A) and without second restenosis (Group B)

	Group A (n = 52)	Group B (n = 49)
Angulated	6 (11.5%)	2 (4.1%)
Bifurcation	6 (11.5%)	2 (4.1%)
Calcification	2 (3.8%)	0 (0%)
Diffuse*	17 (32.7%)	6 (12.2%)
Eccentric	11 (21.2%)	11 (22.4%)
Irregular*	13 (25%)	4 (8.2%)
Ostial	2 (3.8%)	1 (2%)
Thrombus	7 (13.5%)	2 (4.1%)
Total occlusion	9 (17.3%)	7 (14.3%)

*p<0.05 ; Univariate analysis

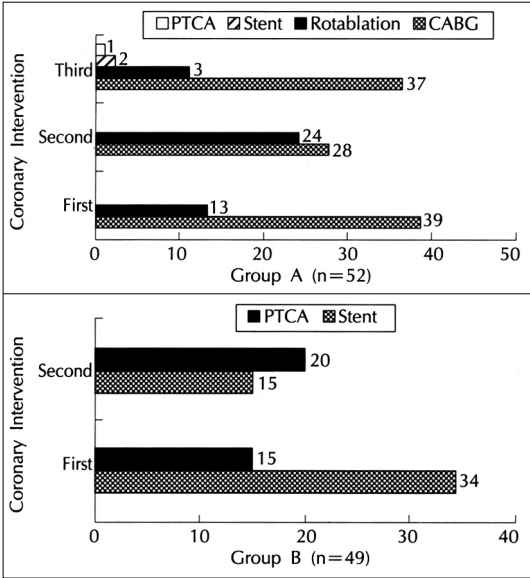


Fig. 1. Coronary interventions in patients with second restenosis (Group A) and without second restenosis (Group B). PTCA : percutaneous transluminal coronary angioplasty, CABG : coronary artery bypass graft.

관상동맥 중재술의 시술

, A 13 (25%),
B 15 (30.6%)

Table 5. Lesion characteristics in patients with second restenosis (Group A) and without second restenosis (Group B)

	Group A (n = 52)	Group B (n = 49)
Primary lesion		
RD (mm)	3.0 ± 0.7	2.9 ± 0.5
MLD (mm)	0.75 ± 0.4	0.74 ± 0.3
Length (mm)*	15 ± 8.7	10 ± 5.8
DS (%)	75.1 ± 11.7	74.7 ± 11.8
Acute gain (mm)	1.8 ± 0.6	1.8 ± 0.5
Residual stenosis (%)	14.8 ± 13.8	9.8 ± 12.3
Late loss (mm)	1.7 ± 0.5	1.23 ± 0.9
Loss index	0.98 ± 0.2	0.66 ± 0.5
Restenotic lesion		
RD (mm)	3.0 ± 0.7	3.0 ± 0.6
MLD (mm)	0.84 ± 0.4	1.37 ± 0.9
Length (mm)	15.9 ± 9.4	12.3 ± 5.4
DS (%)	72.0 ± 12	56.0 ± 25
Acute gain (mm)	1.77 ± 0.6	1.81 ± 0.5
Residual stenosis (%)	13.1 ± 17.4	8.7 ± 20.8
Late loss (mm)	1.8 ± 0.8	0.17 ± 1.0

RD : reference diameter, MLD : minimal luminal diameter, DS : percent stenosis of lesion site, *p<0.05 (OR 1.11, 95% CI 1.03 - 1.19)

A 24 (46.2%), B 20 (51%)
37 (72.5%),
11 (21.6%), rotablation 2 (3.9%),
1 (2%)

(Fig. 1).

100% ,
A 96.2%, B 100% A 90.4%
2
A 가 4 , 3 ,
2 , B 3 ,
2 , 1 가

관상동맥중재술 소견의 분석 결과

(reference diameter),
(minimal luminal diameters),

Table 6. Predictors for second restenosis by multivariate analysis in patients with second restenosis (Group A) and without second restenosis (Group B)

		Group A	Group B	OR (95%CI)	p value
Indications for follow-up angiography	Symptomatic or positive stress test	42 (80.8%)	19 (38.2%)	8.17 (2.86 - 23.3)	<0.01
	Elective	10 (19.2%)	30 (61.2%)		
Lesion Type	<B ₁	18 (34.6%)	36 (73.5%)	5.75 (2.01 - 16.4)	<0.05
	B ₂	34 (65.4%)	13 (26.5%)		

(lesion length), (diameter stenosis), 가
 residual stenosis), (acute gain), (re - 90%
 , 가 A 15 ± 8.7 mm, B 30 .¹⁾
 10 ± 5.8 mm (p<0.05)가 (Table 5). 1977 Andreas Grntzig²⁾
 20 ,
 ACC/AHA 가 가 가
 가 가 .³⁻⁶⁾
 , ,
 가 (OR 1.11, 1.03 -
 1.19, 95%CI).
 NHLBI(National Heart Lung and Blood Institute)
 추적관상동맥 조영술 , 가 1%,
 A 5.2 ± 4.2 4.3%, 1.8% .¹⁾
 , B 7.2 ± 5.4 , 2 ,
 A 8.2 ± 4.8 30 50% 6
 , B 8.9 ± 5.1 ,
 , 가 A .⁷⁻¹²⁾
 42 (80.8%), B 19 (38.8%)
 가 (p<0.01),
 (multiple logistic regression analysis) ,
 가 (Table 6).
 (de novo lesion) 2
 A 26 (50%), B 15 .¹³⁻¹⁸⁾
 (30.6%) (p<0.05).
 고 찰
 (angiographic restenosis)
 (clinical restenosis), (histologic
 restenosis) 가 , 50%
 .⁶⁾
 가 , STent RES -
 tenosis Study(STRESS) BELgian NEtherlands

STENT(BENESTENT) 19)20) , Belle 26)

가

22 31.6% ,

가 . Johanbsson 27)

161

가 .

aspirin ticlopidine 21)

가 , chole -

sterol

(25 49%)

가 .

Seok Muller 28)

lipid deposition

가 , Joo 23)

2 Bauters 29)

가 , 99 32 (39%) 2

86%

가

가 52 (51.4%) 2

가 90.4%

2

Bauters 29) 3

2

20 mm , collateral , 가

30%

1

Glazier 24) 5.25 ± 4.2 7.29 ± 5.4

50%

Bauters 29)

86% 39%

가 , 6 2 30) , Teirstein

가

3 71%, 3 30%

2 2

Califf 25) Nobuyoshi , 7)8) Dangas 31)

3

4

본 연구의 제한점

. Dantas ³¹⁾

가

1

가

Dimas ³²⁾

2

가

55 (11.8%)

33 (7.1%)

요 약

48%

연구 배경 :

2

가

가

(de

novo lesion) (50% vs. 30.6%)

1 (2%)

대상 및 방법 :

2

, Desmarais ³³⁾

Lipopro -

1996 1

1998 12

tein(a)

4,692 , 3030

TIMI flow가

45%

56.6±9.9 , : =44 : 8) 2 52 (A

49 (B 53.8±8.5 , : =44 : 5)

19%

. Hirshfel ³⁴⁾

결 과 :

20 61% 가

40%

1)

. Foley ³⁵⁾

가

(minimal luminal diameter)

AHA/ACC

2)

2

(32.7% vs 61.2%),

2

B₂

(43.2% vs 26.5%),

(25% vs 12.2%)

(de novo lesion)

2

(50% vs 30.6%, p<0.05).

3)

ACC/AHA

가

2

A

가

B₂

34 (65.4%)

B

13

(26.5%)

(p<0.05).

3)

가

가 A 15

± 8.7 mm, B 10 ± 5.8 mm 가

($p < 0.05$).

4)

가

가 A 42

(80.8%), B 19 (38.8%) 가

($p < 0.01$).

결 론 :

1

2

가 가

, ACC/AHA

B₂

중심 단어 : 2

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