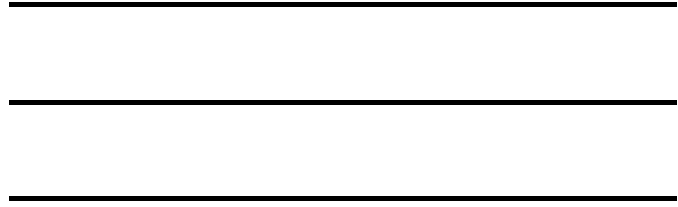




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<b>1.</b>	.....	<b>6</b>
<b>2.</b>	.....	<b>7</b>
가.	.....	<b>7</b>
.	.....	<b>7</b>
.	.....	<b>7</b>
(1)	.....	<b>7</b>
(2)	.....	<b>8</b>
.	.....	<b>8</b>
(1)	.....	<b>8</b>
(2)	.....	<b>8</b>
.	.....	<b>8</b>
<b>3.</b>	.....	<b>9</b>
<b>4.</b>	.....	<b>9</b>
.	.....	<b>11</b>
<b>1.</b>	.....	<b>11</b>
<b>2.</b>	.....	<b>12</b>
<b>3.</b>	.....	<b>13</b>
<b>4.</b>	.....	<b>14</b>
<b>5.</b>	.....	<b>15</b>

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	37
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가 가

1992 1991  
( )  
1998 가  
( )  
1 MACE (major adverse cardiac events)

1. 614 ( : 294 , : 320 )  
(25.6% vs. 17.3%, p<0.05), (28.1%  
vs. 19.7%, p<0.05), 가 (15.8% vs. 4.0%, p<0.05)  
(43.0% vs. 34.5%, p<0.05) 가

2. 3 vessel  
 disease(18.6% vs 9.7%, p<0.05) ACC/AHA  
 type B<sub>2</sub>, type C† (78.2% vs 46.9%, p<0.05).  
 (4.0%±6.0 vs  
 19.4%±10.0, p<0.05), , ,  
 , .  
 (65.1% vs 24.3%),  
 (43.5% vs 14.5%),  
 (95.1% vs 3.7%) (p<0.05).

3. MACE  
 1 , 6 , 12  
 (1 : 97.0% vs 93.9%, 6 : 89.6% vs 82.3%, 12 :  
 83.7% vs 77.2%, p=0.03). Cox regression model  
 (1 : 98.2% vs 92.3%, 6 :  
 93.0% vs 80.5%, 12 : 89.0% vs 73.4%).

4. MACE  
 ACC/AHA (odds ratio[OR]=3.0, 95% confidence  
 interval[CI] 1.7 - 5.3, p=0.0001) (OR=2.3, 95% CI  
 1.4 - 3.9, p=0.0008) . ACC/AHA  
 (OR=2.50, 95% CI 1.4 - 4.4)  
 가 (OR=2.42, 95% CI 1.20 -  
 4.91). (OR=2.7, 95% CI 1.3 - 5.6)  
 , (OR=4.8,  
 95% CI 1.6 - 14.2), (OR=4.4, 95% CI 1.2 - 15.7)  
 .

## 5. ACC/AHA

1 96.6%, 6 87.8%, 12 81.2% (1  
: 91.0%, 6 : 74.5%, 12 : 68.0%)  
(p=0.0024).

MACE

가

MACE

가

가

---

: , ,

<

>

(balloon angioplasty)

Gruntzig 20

.<sup>1</sup> ,

가

가 .<sup>2-4</sup>

1986

5

,

,

.

가 가

<sup>6-8</sup>,

MACE(major adverse cardiac event)

9

가

( )

가

(

)

1

MACE

, 1 ,

6 , 12

(cardiac event-free survival rate)

II.

1.

1980

1991

1990

1991

1992

1998

,

,

가

60%

1

가

,

50%

,

(directional or rotational atherectomy)

,

20%

,

.

2.

가.

10 , , ,  
 , 가

total cholesterol, HDL-cholesterol,

Q , Q

(1)

2mm

60%

( ,

, )  
disease)

(1 vessel  
(2 vessel or 3 vessel disease)

(%)

(2)

American College of Cardiology(ACC) / American Heart Association(AHA) type A, type B(type B<sub>1</sub> or type B<sub>2</sub>), type C .<sup>11</sup>

.

,

가 가

가 60%

.

(1)

1991 - 1992

, ,

(2)

1998

, .

,

direct PTCA(percutaneous transluminal coronary angioplasty) , ,

.

.

, , ,



3.

(study entry point) ,  
MACE(major adverse cardiac event) , ,  
(target or non-  
target vessel revascularization) , MACE  
(event)  
1 , 6 , 12 MACE

4.

chi-square test  
Fisher exact test ,  
(cumulative event-free survival rate)  
Kaplan-Meier log-  
rank test ,  
Cox regression model  
Cox regression model enter

method

forward conditional method

SPSS 9.0 for windows

95%

### III.

1.

614 , 294 , 320  
 (Table 1). , 가 25.6%,  
 , 28.1% ( ; 17.3%, ; 19.7%)  
 가 가 15.8%  
 4.0% .  
 가 189.2±9.6 mg/dl 153.4±5.7  
 mg/dl total cholesterol, HDL-  
 cholesterol .  
 (Table 2), Q Q  
 (38.8% vs 32.4%,  
 p=0.04).  
 가

**Table 1. Difference of baseline characteristics between the balloon and the stent group**

	Balloon angioplasty group (n=294)	Stent group (n=320)
<b>Clinical</b>		
Age (years)	56±9.1	59±9.9
Male (%)	73.1	73.1

Hypertension (%)	43.0	50.2
Diabetes (%)*	17.3	25.6
Smoker (%)	56.6	51.5
Hyperlipidemia (%)*	19.7	28.1
Family history of ischemic heart diseases(%)*	4.0	15.8
Past history of cerebral vascular accidents (%)	2.9	3.0
<b>Laboratory value(mg/dl)</b>		
Total cholesterol	206.0±15.4	200.9±20.1
Triglycerides*	189.2±9.6	153.4±5.7
HDL-cholesterol	37±10	40±10
<b>LV<sup>1</sup> ejection fraction (%)</b>	<b>55.5±12.9</b>	<b>54.9±13.2</b>

<sup>1</sup>LV ; left ventricle.

Results of continuous variables are mean±SD.

\* ; p< 0.05

**Table 2. Difference of clinical diagnosis between the balloon and the stent**

	<b>Balloon angioplasty group (n=294)</b>	<b>Stent group (n=320)</b>
<b>Initial diagnosis*</b>		
Stable angina (%)	17.4	13.3
Unstable angina (%)	48.0	42.7
Non-Q <sup>1</sup> MI (%)	2.1	5.2
ST elevation QMI (%)	32.4	38.8
<b>Location of AMI</b>		
Anterior and anteroseptal (%)	44	48
Posterior and lateral (%)	10	9
Inferior (%)	46	43

<sup>1</sup>AMI ; acute myocardial infarction.

\* ; p< 0.05

2.

(Table 3)

9.7% , 3 vessel disease 18.6% ,  
가 .  
가 .

ACC/AHA type A (12.4%)  
 (4.2%) type B<sub>2</sub>  
 type C 46.6% 31.6% (typeB<sub>2</sub>;  
 34.4%, type C; 12.5%)

**Table 3. Difference of angiographic findings between the balloon and the stent group**

	Balloon angioplasty group (n=294)	Stent group (n=320)
<b>Lesion severity (%)*</b>		
1 vessel diseases	56.6	51.3
2 vessel diseases	33.7	30.1
3 vessel diseases	9.7	18.6
<b>Vessels involved (%)</b>		
Left anterior descending artery	53	51
Left circumflex artery	20	17
Right coronary artery	24	31
<b>Lesion morphology (AHA/ACC)*</b>		
Type A	12.5	4.2
Type B1	40.7	17.6
Type B2	34.4	46.6
Type C	12.5	31.6

\* ; p<0.05.

3.

(MLD; mean luminal diameter)  
 (1.14 ) (1.08 ) (Table 4).  
 direct PTCA(percutaneous transluminal coronary angioplasty) (32%) (10%)  
 (4.0%)  
 (19.4%)

가 (Table 4).

**Table 4. Procedural parameters in the balloon and the stent**

	<b>Balloon angioplasty group (n=294)</b>	<b>Stent group (n=320)</b>
Mean balloon diameter (mm)	2.8±0.3	3.0±0.4
Mean stent diameter (mm)		3.7±3.0
Treatment modes of <sup>1</sup> AMI*		
Direct <sup>2</sup> PTCA (%)	10	32
Thrombolysis (%)	39	32
Conservative management (%)	51	36
Residual stenosis (%)*	19.4±10.0	4.0±6.0
Mean <sup>3</sup> No. of lesion treated*	1.08±0.27*	1.14±0.35
Mean No. of vessels non-revascularized	0.50±0.66	0.61±0.70
Infarct related artery (%)		
Left anterior descending artery	47.3	48.5
Left circumflex artery	19.7	17.2
Right coronary artery	33.0	34.3

<sup>1</sup>AMI ; acute myocardial infarction

<sup>2</sup>PTCA ; percutaneous transluminal coronary angioplasty.

<sup>3</sup>No. ; number.

\* ; p<0.05.

4.

가 95.1%

(Table 5).

**Table 5. Drug treatment after intervention**

<b>Balloon angioplasty</b>	<b>Stent group</b>
----------------------------	--------------------

	group (n=294)	(n=320)
Aspirin (%)	97.5	98.9
Anti-platelet agents (%)*	95.1	3.1
Beta blockades (%)*	24.3	65.1
ACE <sup>1</sup> inhibitors (%)*	14.5	43.5
Calcium channel block (%)*	92.8	54.3
Nitrates	20.7	27.4

\* ; p<0.05

<sup>1</sup>ACE ; angiotensin converting enzyme.

5.

가. MACE(major adverse cardiac event) (event-free survival rate)

, 1 , 6 , 12 MACE

MACE (Table 6)

Kaplan-Meier

1

, 6 , 12 97%, 90%, 84%

94%, 82%, 77%

(Table 3, Figure 2)(p=0.03, log rank test).

1 6.8%, 6 10.0%, 12 13.1%

1 6.1%, 6 9.8%, 12 11.6%

**Table 6. MACE(major adverse cardiac event) and Cardiac event-free survival rates**

	<b>Balloon angioplasty group (n=294)</b>	<b>Stent group (n=320)</b>
<b>MACE<sup>1</sup> at in-hospital period</b>		
Death (%)	0.7(2)	1.3
<sup>2</sup> AMI (%)	1.1	0.6
<sup>3</sup> CABG (%)	0.7	0.3
Target vessel revascularization (%)	1.1	0.3
Non-target vessel revascularization(%)	0.4	0.3
<b>Total MACE (%)</b>	<b>4.0</b>	<b>2.8</b>
<b>MACE at 1 month</b>		
Death (%)	0.7	1.3
AMI (%)	1.9	0.7
CABG (%)	0.7	0
Target vessel revascularization (%)	3.0	0.7
Non-target vessel revascularization(%)	0.4	1.0
<b>Total MACE (%)</b>	<b>6.7</b>	<b>3.7</b>
<b>MACE at 6 month</b>		
Death (%)	1.1	1.8
AMI (%)	3.1	1.4
CABG (%)	2.3	2.8
Target vessel revascularization (%)	11.9	6.7
Non-target vessel revascularization(%)	0.8	1.4
<b>Total MACE (%)</b>	<b>19.2</b>	<b>14.0</b>
<b>MACE at 12 month</b>		
Death (%)	1.2	1.8
AMI (%)	3.9	1.5
CABG (%)	2.4	2.9
Target vessel revascularization (%)	15.7	8.4
Non-target vessel revascularization(%)	0.8	2.5
<b>Total MACE (%)</b>	<b>23.9</b>	<b>27.1</b>
<b>Cardiac event-free survival rates<sup>*</sup></b>		
1 month (%)	93.9	97.0
6 month (%)	82.3	89.6
12 month (%)	77.2	83.7

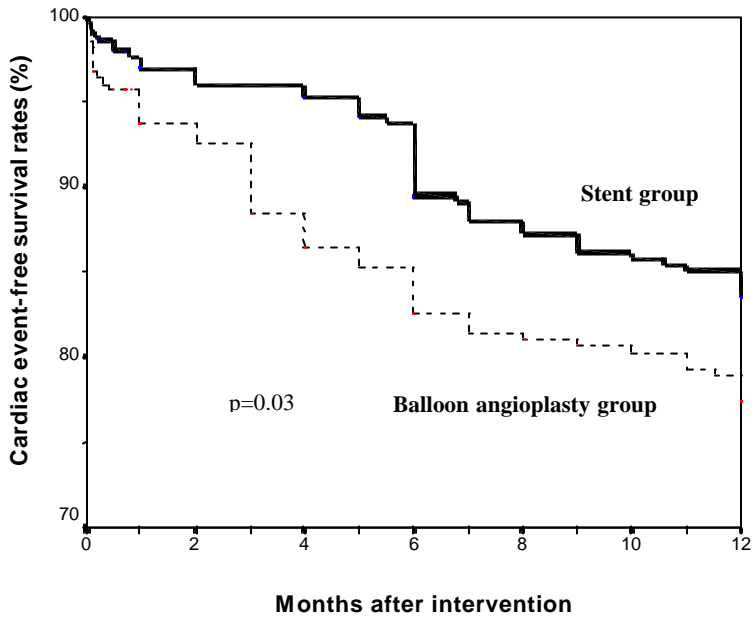
<sup>1</sup>MACE percentage means cumulative counts of cardiac events.

<sup>\*</sup> ; p= 0.03, log rank test. Cardiac event-free survival rates were analyzed by Keplan-Meier method.

<sup>2</sup>AMI ; myocardial infarction

<sup>3</sup>CABG ; coronary artery bypass grafting





**Figure 1. 12 months cardiac event-free survival rates using Kaplan-Meier Method.**

. Cox regression model

1990

가 가 Kaplan-Meier

Cox regression model

enter method

MACE

ACC/AHA

type B<sub>2</sub>, type C

2.5 MACE

(odds

ratio[OR]=2.5, 95% confidence interval[CI] 1.4 - 4.4; p=0.001)

가 (Table 7).

**Table 7. Cox regression analysis of major risk factors for major adverse cardiac events in the balloon angioplasty group**

	<b>Odds Ratio</b>	<b>95% Confidence Interval</b>
Age (per year)	1.0	0.9-1.1
Male sex	1.0	0.4-2.1
Diabetes	1.4	0.7-3.6
Hypertension	1.1	0.6-1.9
Smoking	1.0	0.5-2.0
Acute myocardial infarction	1.1	0.6-1.9
Lesion morphology (complex lesions)*	2.5	1.4-4.4
Reference diameter	0.8	0.3-1.9
Number of lesion treated	1.1	0.4-3.0
Number of vessels non-revascularized	1.4	0.7-2.5
Residual stenosis (%)	1.0	1.0-1.2

\* means the most significant risk factor in the balloon angioplasty group.

#### MACE

2.7

(OR=2.7, 95% CI 1.3 - 5.6; p=0.005)(Table 8).

**Table 8. Cox regression analysis of major risk factors of major adverse cardiac events in the stent group**

	<b>Odds Ratio</b>	<b>95% Confidence Interval</b>
Age (per year)	0.9	0.9-1.0
Male sex	1.1	0.4-2.9
Diabetes	1.5	0.7-3.0
Hypertension *	2.7	1.3-5.6
Smoking	1.9	0.8-4.5
Acute myocardial infarction	1.8	0.9-3.4
Lesion morphology (complex lesions)	2.3	0.8-6.6
Reference diameter	0.7	0.3-1.8
Number of lesion treated	1.0	0.4-1.5
Number of vessels non-revascularized	1.9	0.9-4.2
Residual stenosis (%)	1.0	0.9-1.2

\* means the most significant risk factor in the stent group.

forward method

ACC/AHA

(OR=3.0, 95% CI 1.7 – 5.3, p=0.0001)

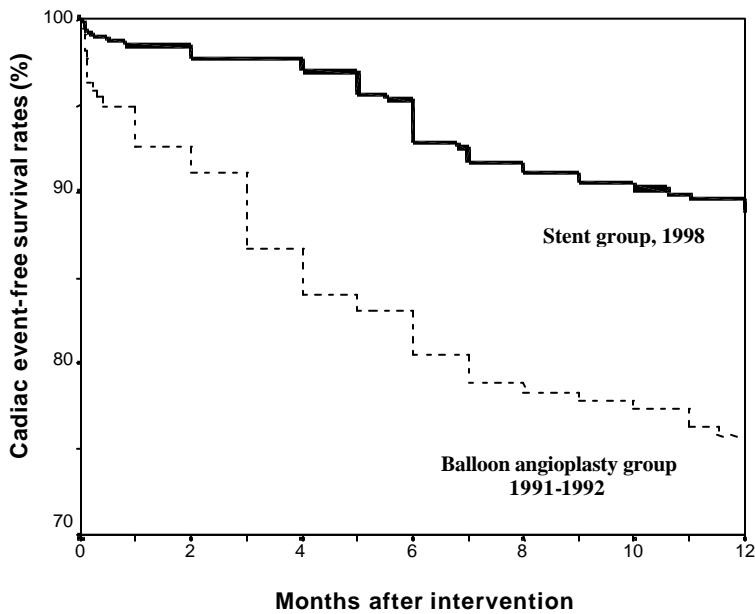
(OR=2.3, 95% CI 1.4 – 3.7, p=0.0008).

(1 98.2%; 6 93.0%; 12 89.0%) (1 92.3%; 6 80.5%; 12 73.4%)

(Table 9, Figure 2).

**Table 9. Cardiac event-free survival rates using Cox regression model**

	Balloon angioplasty group (n=294)	Stent group (n=320)
<b>Cardiac event-free survival rates</b>		
1 month (%)	92.3	98.2
6 month (%)	80.5	93.0
12 month (%)	73.4	89.0



**Figure 2. 12 months cardiac event-free survival rates using Cox regression model**

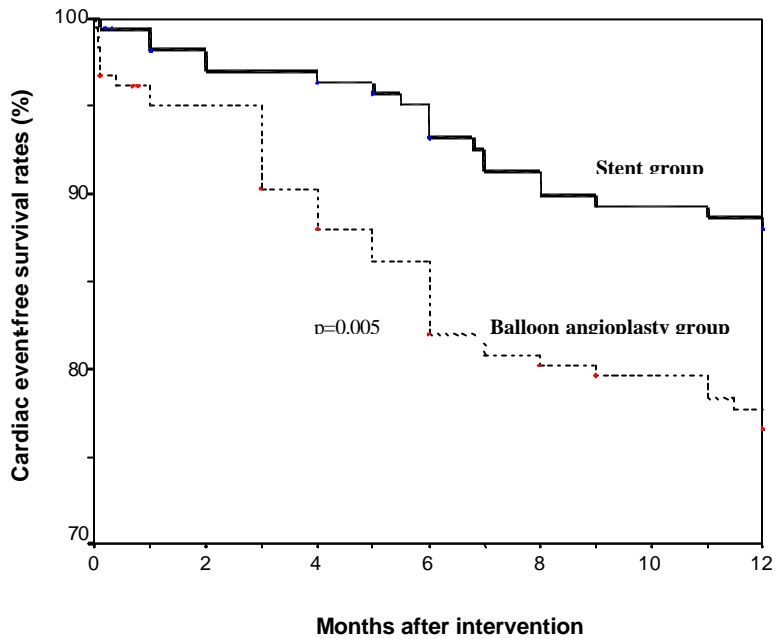
171  
 183 . Kaplan-Meier  
 가 1 , 6 , 12  
 (Table 10, Figure 3).

**Table 10. Cardiac event-free survival rates excluding AMI patients**

	<b>Balloon angioplasty group (n=181)</b>	<b>Stent group (n=171)</b>
<b>Cardiac event-free survival rates*</b>		
1 month (%)	95.0	98.2
6 month (%)	82.0	93.2
12 month (%)	76.5	87.3

\* ; p=0.005, Kaplan-Meier method, log rank test

AMI ; acute myocardial infarction



**Figure 3. 12 months cardiac event-free survival rates excluding acute myocardial infarction. This Kaplan-Meier analysis only included stable and unstable angina. (p=0.005, log rank test)**

	MACE	
ACC/AHA	(complex lesion)	2.42
MACE	(OR=2.42, 95% CI 1.20 - 4.91, p=0.01)	
	MACE	
가		
MACE	가	
4.8	(OR=4.8, 95% CI 1.6 - 14.2,	
p=0.005)	(OR=4.4, 95% CI 1.2 - 15.7, p=0.009)	

. ACC/AHA

(1) ACC/AHA

ACC/AHA

가

type B<sub>1</sub> B<sub>2</sub> B type A

B<sub>1</sub> (simple lesion), type B<sub>2</sub> C

(complex lesion)

type A, type B, type C Kaplan-

Meier (Table 11, Figure 4) type A 1, 6

12 97.1%, 94.0% 88.0%

type B 1 93.6%, 6 83.9%, 12 79.4%, type C

1 91.2%, 6 63.8%, 12 54.7%

(p=0.001, log rank test).

, (Table 11, Figure 5)

1, 6, 12

96.3%, 90.7% 86.6% 91.0%, 74.5%, 68.0%

(p=0.0003, log rank test).

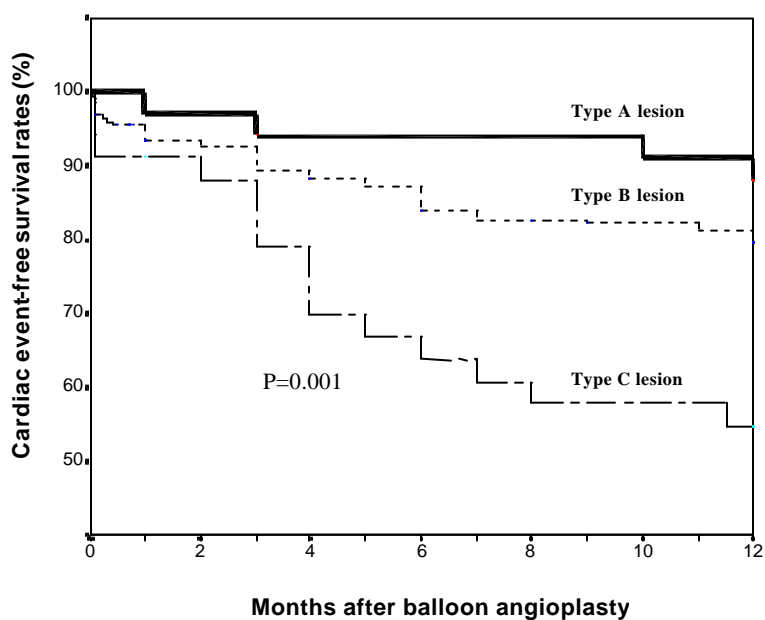
**Table 11. Difference of 12 months cardiac event-free survival rates in the balloon group according to lesion morphology: those with ACC/AHA classification type A, B(B1, B2), C, or simple(type A, B1), complex(type B2, C) lesions, perceiving balloon angioplasty in 1991-1992.**

	Type A (n=36)	Type B (n=221)	Type C (n=37)
<b>Cardiac event-free survival rates*</b>			
1 month (%)	97.1	93.6	91.2
6 month (%)	94.0	83.9	63.8
12 month (%)	88.0	79.4	54.7
	<b>Simple lesions</b>	<b>Complex lesions</b>	

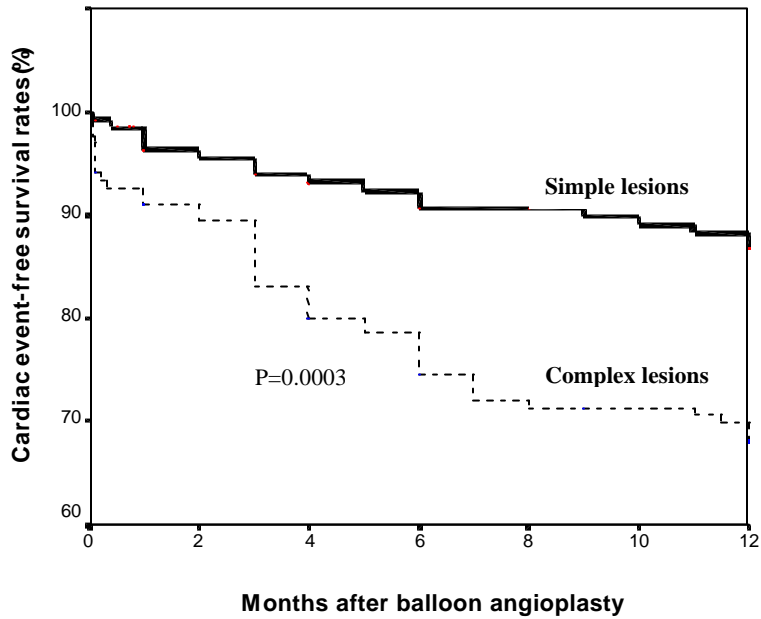
	(n=156)	(n=138)
<b>Cardiac event-free survival rates<sup>†</sup></b>		
1 month (%)	96.3	91.0
6 month (%)	90.7	74.5
12 month (%)	86.6	68.0

\* ; p=0.001, Kaplan-Meier method, log rank test.

† ; p=0.0003, Kaplan-Meier method, log rank test.



**Figure 4. 12 months cardiac event-free survival rates in the balloon group according to lesion morphology: those with ACC/AHA classification type A, those with type B(B1, B2), and those with type C. The survival difference was statistically significant by log rank test.**



**Figure 5. Difference of 12 months cardiac event-free survival rates between simple lesions and complex lesions in the balloon group. The survival difference was statistically significant by log rank test.**

type A, B, C  
 가 (Table 12, Figure 6)  
 1, 6, 12  
 96.4%, 95.4%, 92.1% (1 ;  
 97.5%, 6 ; 87.8%, 12 ; 81.1%)  
 (Table 12, Figure 7).

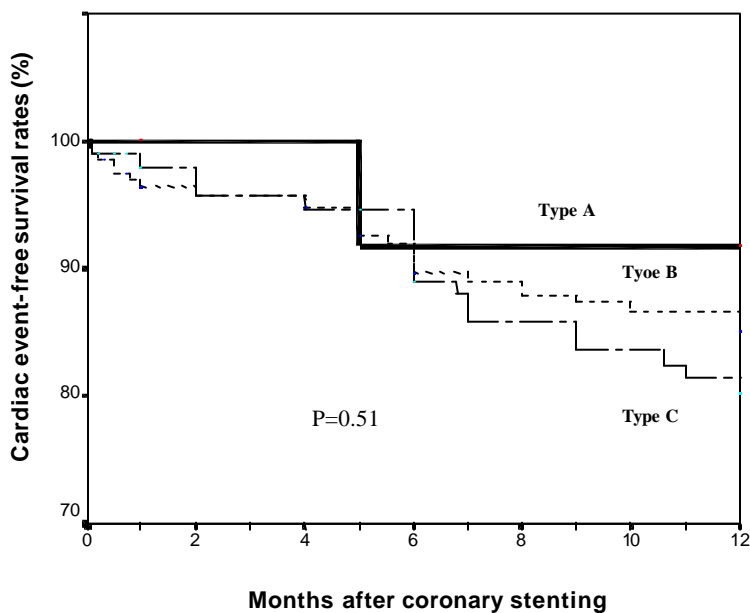
**Table 12. Difference of 12 months cardiac event-free survival rates in the stent group according to lesion morphology: those with ACC/AHA classification type A, type B (B<sub>1</sub>, B<sub>2</sub>), type C, or simple(type A, B<sub>1</sub>), complex(type B<sub>2</sub>, C) lesions, perceiving stent implantation in 1998.**



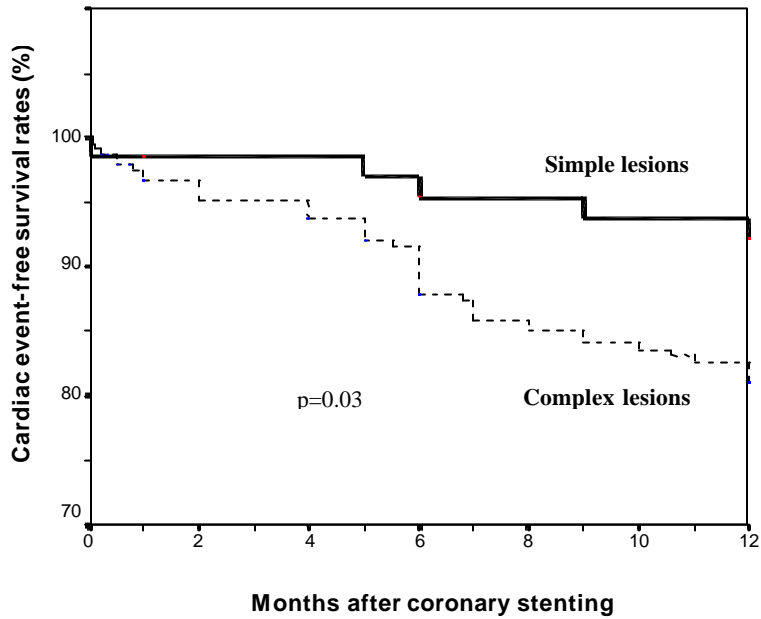
	Type A (n=13)	Type B (n=205)	Type C (n=102)
<b>Cardiac event-free survival rates*</b>			
1 month (%)	100.0	96.4	97.7
6 month (%)	91.6	89.6	89.1
12 month (%)	91.6	84.9	80.2
	Simple lesions (n=70)	Complex lesions (n=250)	
<b>Cardiac event-free survival rates†</b>			
1 month (%)	96.4	97.5	
6 month (%)	95.4	87.8	
12 month (%)	92.1	81.1	

\* ; p=0.51, Kaplan-Meier method, not significant by log rank test

† ; p=0.003, Kaplan-Meier method, log rank test



**Figure 6. 12 months cardiac event-free survival rates in the stent group according to lesion morphology: those with ACC/AHA classification type A, those with type B(B1, B2), and those with type C. The survival difference was not significant by log rank test.**

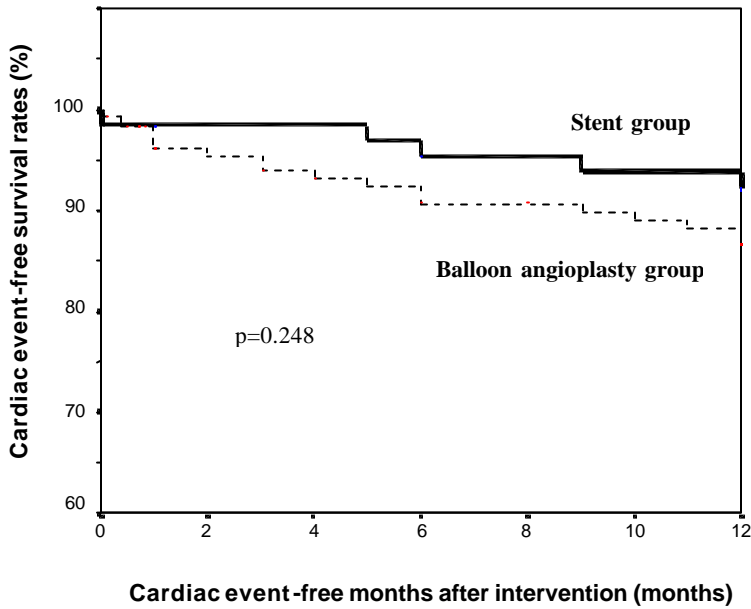


**Figure 7. Difference of 12 months cardiac event-free survival rates between simple lesions and complex lesions in the stent group. The survival difference was statistically significant by log rank test.**

(2) ACC/AHA

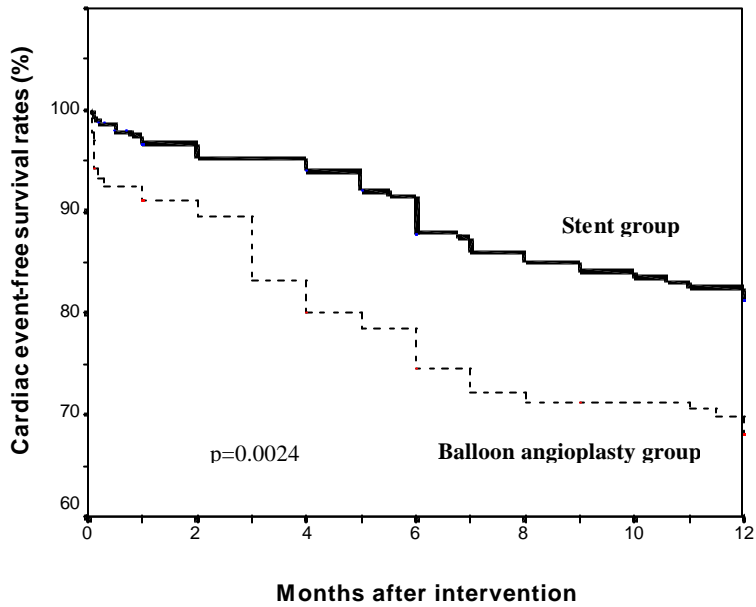
ACC/AHA

1, 6, 12 98.5%,  
 95.4%, 92.1% (1 : 96.3%,  
 6 : 90.7%, 12 : 86.6%)  
 가 (p=0.248, log rank  
 test)(Figure 8).



**Figure 8. Difference of 12 months cardiac event-free survival rates between the balloon group and the stent group in simple coronary lesions: Simple lesions are ACC/AHA classification type A and B<sub>1</sub>. The survival difference was not significant by log rank test.**

1 , 6  
 , 12 96.6%, 87.8%, 81.2%  
 (1 : 91.0%, 6 : 74.5%, 12 :  
 68.0%) (p=0.0024,  
 log rank test)(Figure 9).



**Figure 9. Difference of 12 months cardiac event-free survival rates between the balloon angioplasty group and the stent group in complex coronary lesions: complex lesions are ACC/AHA classification type B<sub>2</sub> and C. The survival difference was statistically significant by log rank test.**

IV.

(percutaneous transluminal coronary angioplasty)

1990

가 . 1986  
5 1990

가

가  
30-50%  
2-5

1990

. 1991 multicenter European registry  
20% 1994 Benestent I trial  
3.5% .<sup>12-13</sup> , 1994

14-15

1%

가 .<sup>16</sup>  
가

.<sup>17-18</sup>

가

1990 1993 36 ,  
1994 71 , 1995 210  
가가 1998 458 ,  
1999 500 가  
1991 1992

1998  
1  
가

가 1998 가

1990 ACC/AHA type B<sub>2</sub> type C 3 vessel disease 가

3 가 1991-92 , , 가

1990 가

1 MACE

MACE 1 ,

6 , 12 MACE

MACE Cox regression

model Kaplan-Meier MACE

MACE

가

1994 STRESS trials 96.1%

7 80.5%

.<sup>19</sup> 1997 Benestent II trial 30% MACE

7 79.9% <sup>20</sup>

<sup>21-22</sup>

6 84-

89% ACC/AHA classification type C

35mm 75%

23-24

6, 12

89.6% 83.7%

MACE 가

ACC/AHA

MACE 가

MACE 가

MACE

ACC/AHA

가

가

ACC/AHA 가

가

25-27

type A,

type B<sub>1</sub>, type B<sub>2</sub>, type C

type A, type B1

type B<sub>2</sub>, type C

27



가

MACE

28-30

direct PTCA

30

20%

가

31

MACE

가 가

47% -71%

32, 33 Kornowski 34 (IVUS;

intravascular ultrasound)

MACE 가  
MACE  
(diffuse type in-stent restenosis)  
가 가 ,  
가 <sup>34-36</sup>  
MACE  
MACE  
MACE  
, MACE  
가 가

V.

1991 -1992

1998

1

1. 614 ( 294 , 320 )  
가 , 가 , 가 ,  
가 .

2. 3 vessel  
disease ACC/AHA type B<sub>2</sub>, type C가  
가

3. MACE  
1 , 6 , 12  
Cox regression  
model 가  
MACE 가 .

4. MACE  
ACC/AHA

가

가

MACE

MACE

가

MACE

가

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Abstract

A Comparison of Clinical Outcomes and Risk for  
Major Adverse Cardiac Events  
between Pre - stent era and Post - stent era

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Since the first stents were implanted in patients with ischemic heart diseases in 1986, several studies have demonstrated improved outcomes with stents over balloon angioplasty. The purpose of this study was to compare clinical outcomes between balloon angioplasty group(balloon group)and stent implantation group(stent group), and to analyze the risk factors for major adverse cardiac events (MACE).

Clinical outcomes for 294 patients with ischemic heart diseases who underwent balloon angioplasty alone in 1991 and 1992, were compared with those for 320 patients who underwent stent implantation in 1998. Duration of follow-up was 12 months and MACE such as death, myocardial infarction, coronary artery bypass graft, and target and non-target vessel revascularization were recorded retrospectively.

There were more patients with diabetes (25.6% vs 17.3%,  $p<0.05$ ), familial history of coronary arterial diseases(15.8% vs 4.0%,  $p<0.05$ ), and hyperlipidemia (28.1% vs 19.7%,  $p<0.05$ ) in the stent group, and more patients using ACE inhibitors (43.5% vs 14.5%,  $p<0.05$ ), beta-blockades

(65.1% vs 24.3%,  $p<0.05$ ), and anti-platelet agents(95.1% vs 3.1%,  $p<0.05$ ) in the stent group. There was no difference in other risk factors and LVEF(left ventricular ejection fraction). The stent group had significantly more 3 vessel diseases (18.6% vs 9.7%,  $p<0.05$ ) and more complex lesion morphology, such as AHA/ACC type B<sub>2</sub> or C (78.2% vs 46.9%,  $p<0.05$ ). MACE rates during hospitalization were similar for both groups (2.8% vs 4.0%,  $p=0.24$ ). The cardiac event-free survival rates in the stent group at 1, 6, and 12 months were significantly higher than that in the balloon group (1 month: 97.0% vs 93.9%, 6 months: 89.6% vs 82.3%, 12 months: 83.7% vs 77.2%,  $p=0.03$ ). With using Cox proportional-hazard model, the stent group had significantly higher cardiac event-free survival rates (1 month: 98.2% vs 92.3%, 6 months: 93.0% vs 80.5%, 12 months: 89.0% vs. 73.4%). Including all the patients in both groups, the main risk factors were lesion morphology (odds ratio[OR]=3.0, 95% confidence interval[CI] 1.7 – 5.3) and coronary stenting (OR=2.3, 95% CI 1.4 – 3.7). The MACE was highly associated with lesion morphology in the balloon group (OR=2.50, 95% CI 1.4 - 4.4) and, hypertension in the stent group(OR=2.7, 95% CI 1.3 - 5.6). Excluding acute myocardial infarction in the stent group, the risk factors for MACE were diabetes (OR=4.8, 95% CI 1.6 - 14.2) and hypertension (OR=4.4, 95% CI 1.2 - 15.7). In simple coronary lesions, there was no difference in cardiac event-free survival rates between both groups. The stent group had significantly higher cardiac event-free survival rates in complex lesions (1 month: 96.6% vs 91.0%, 6 months: 87.8% vs 74.5%, 12 months: 81.2% vs 68.0%,  $p=0.002$ ).

In conclusion, compared with balloon angioplasty in the early 1990s, stent implantation in 1998 was associated with significantly lower MACE rates and higher early and late cardiac event-free survival rates. When analyzing the risk factors associated with MACE respectively, main risk factors were complex lesion morphology (type B<sub>2</sub> or type C) in the balloon angioplasty group and hypertension in the stent group. Further studies will be necessary to

clarify the beneficial effects of coronary implantation and the role of risk factors for MACE.

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Key Words: Balloon angioplasty, Stent implantation, Major adverse cardiac event (MACE), Cardiac event-free survival rates