

관동맥내 MultiLink 스텐트 시술후 추적 관동맥 조영술 소견

- 고압력 풍선확장술의 유용성을 중심으로 -

가

정옥성 · 승기배 · 김종진 · 문건웅 · 유기동
윤호중 · 채장성 · 김재형 · 최규보 · 홍순조

Follow-up Angiographic Results after MultiLink Coronary Stent Implantation

- Is Excessive High Pressure Inflation Necessary for Optimal Stenting? -

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ABSTRACT

Background and Objectives : The objective of this study was to assess the in-hospital clinical outcome and 6 months follow-up angiographic results after flexible balloon expandable MultiLink coronary stenting. The impact of post-stenting excessive high pressure balloon dilation on late outcome is controversial. The other purpose was to investigate the impact of post-stenting high pressure balloon dilation (HPD group 14 atm) on clinical and angiographic outcome in comparison to moderate pressure dilation (MPD group <14 atm). **Materials and Method** : The MultiLink stents were implanted in 124 patients (mean age 58 ± 9 , M/F = 94/30) with 128 lesions. Post-stenting high pressure balloon dilation was performed to have less than 10% of residual stenosis and smooth instant lumen without IVUS guidance. **Results** : The indications for stenting were elective in 88 lesions (69%), suboptimal angioplasty results in 27 lesions (21%), and bail-out in 13 lesions (10%). The incidence of in-hospital major adverse cardiac events was 1.6% and major vascular complication rate was 3.2%. The follow-up angiography was performed in 86 patients (69%) at 7.9 ± 2.6 months. The angiographic restenosis rate was 22.7%. The acute gain of HPD group had a tendency to be higher than MPD group (HPD : MPD = 2.33 ± 0.51 mm : 2.22 ± 0.44 mm, $p = 0.08$) and the late loss of MPD group had a tendency to be lower than HPD group (MPD : HPD = 0.86 ± 0.73 mm : 0.95 ± 0.84 mm, $p = 0.09$). And the net gain and restenosis rate of both groups were similar respectively (HPD : MPD = 1.38 ± 0.94 mm : 1.36 ± 0.83 mm, $p = ns$, HPD : MPD = 22.5% : 22.9%, $p = ns$). **Conclusion** : The MultiLink coronary stent system is a safe and effective device with high procedural success rate and also has the acceptable angiographic restenosis rate for the treatment of coronary artery disease. The post-stenting excessive high pressure balloon dilation might not be necessary during the deployment of MultiLink stent. (Korean Circulation J 1999;29(11):1169-1175)

KEY WORDS : MultiLink stent · High pressure inflation · Restenosis rate.

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서 론

대상 및 방법

(Percutaneous Transluminal Coronary Angioplasty, PTCA)가 1997 1 1998 7 1994 MultiLink 124 STRESS¹⁾ BENESTENT²⁾가 , 2 PTCA, , Q , , , Palmaz - Schatz Gianturco Roubin 6 2 가 ACS MultiLink (GUIDANT ,) 스텐트 시술방법 MultiLink Advanced Cardiovascular Systems(ACS)가 (protective sheath) (delivery system)가 over - thewire 가 , monorail 가 10,000 IU 3 500 mg 200 mg , 4 8 , 7 F 8 F cardiac event, MACE) . 16 , acute gain 가 , late loss : 1 : 1 1.2 : 1 net gain . PTCA 가 가 6 8 , 9 mm Chubby MACE, 6 (Schneider ,) 14 10% 가 14 (1 , high pressure balloon dilation group), 14 (2 ,

moderate pressure balloon dilation group)

관동맥 조영술상 분석 및 통계분석

nitroglycerin 0.2 mg

, 6

on-line QCA(quantitative coronary angio-graphic analysis)

가

50%

PC

SPSS

±

Student t - test

, p

0.05

결 과

대상환자

124

128

129

MultiLink

가 124 94 (76%),

30 (24%), 58 ± 9

58 (47%),

42 (34%), 2 24 (19 %)

220 mg/dl

(Table 1).

관동맥 조영술상 병변의 특징과 스텐트 시술 결과

71 (57%),

53 (43%)

88 (69%)

27 (21%),

가 13 (10%) . MultiLink

가 가 58 가

1 . ACC/AHA

B1 B2 50 (39%)

가 (Table 2). over - the - wire

Table 1. Clinical characteristics of the 124 patients

Characteristics	Number (%)
Age (year)	58 ± 9
Male/female	94/30
Risk factors	40 (32%)
Hypertension	24 (19%)
Diabetes mellitus	22 (18%)
Hypercholesterolemia (> 220 mg/dl)	51 (41%)
Current smoker	58 (47%)
Clinical diagnosis	42 (34%)
Stable angina	24 (19%)
Unstable angina	
Recent myocardial infarction (< 2 weeks)	
Number of diseased vessels (n)	
1	71 (57%)
2	40 (32%)
3	13 (11%)

Table 2. Angiographic characteristics of the 128 lesions

Characteristics	Number (%)
Artery dilated	
LAD	58 (45%)
LCX	27 (21%)
RCA	41 (32%)
LM and graft	2 (2%)
Lesion morphology (ACC/AHA)	
A	23 (18%)
B1	50 (39%)
B2	50 (39%)
C	5 (4%)
Indications	
Elective	88 (69%)
Suboptimal	27 (21%)
Bailout	13 (10%)
De novo lesion	115 (90%)
Restenotic lesion	13 (10%)

LAD : left anterior descending artery, LCX : left circumflex artery, RCA : right coronary artery, LM : left main coronary artery, ACC/AHA : American college of cardiology/American heart association

MultiLink 가 1 ,
128 15 mm 129 가
, 3.0 mm가 66 , 3.25 mm
가 5 , 3.5 mm가 48 , 4.0 mm가 10 .
25 mm

가 추적 관동맥 조영술 소견

2 68 86 88 (69%)

14 7.9 ± 2.6 88 20

(2), 60 14 22.7%

(1). 88 40

(45%) 14 18 , 14.9 ± 0.7

초기 병원내 중요 임상상

MultiLink (1), 48 (55%) 8 13 , 10.4 ± 1.5

(2).

dissection , 가 ,

4 % . 1

3.22 ± 0.35 mm 2 3.06 ± 0.36

4 mm , ,

major bleeding 2 가 . 1

1 pseudoaneurysm, 1 acute gain 2.33 ± 0.51 mm 2 2.22 ± 0.44

arteriovenous fistula (Table 3). mm (p=0.08) , 1 late loss 0.95

가 ± 0.84 mm 2 0.86 ± 0.73 mm

(p=0.09)

Table 3. Clinical outcome after multiLink stent implanta-tion

	Number (%)
Procedural success	122 (98.4%)
Clinical events	
Death	1 (0.8%)
Non-fatal myocardial infarction	0 (0%)
Repeat PTCA	1 (0.8%)
Urgent CABG	0 (0%)
Major bleeding complications	4 (3.2%)

net gain 1.38 ± 0.94 m

m, 1.36 ± 0.83 mm .

1 2 22.5%, 22.9%

가 (Table 4).

고 안

MultiLink

6 ,

Table 4. Angiographic follow-up results of multiLink stenting

	HPD group (n = 40)	MPD group (n = 48)	p-value
Pressure (atm.)	14.9 ± 0.66 (14 - 18)	10.4 ± 1.5 (8 - 13)	<0.001
B/A ratio	1.05 ± 0.08	1.07 ± 0.09	NS
Lesion length (mm) Pre RD (mm)	8.89 ± 5.45	8.71 ± 3.69	NS
Pre MLD (mm)	3.15 ± 0.37	3.05 ± 0.36	NS
Post MLD (mm)	0.89 ± 0.35	0.84 ± 0.37	NS
F/U MLD (mm)		3.06 ± 0.36	<0.05
Pre DS (%)	2.27 ± 0.91	2.20 ± 0.75	NS
Post DS (%)	71.7 ± 11.8	72.5 ± 12.7	NS
F/U DS (%)	1.8 ± 7.3	2.2 ± 9.8	NS
Acute gain (mm)	29.0 ± 20.3	27.9 ± 19.9	NS
Late loss (mm)	2.33 ± 0.51	2.22 ± 0.44	NS

HPD : high pressure dilation, MPD : moderate pressure dilation, atm. : atmosphere, B/A ratio : balloon/artery ratio, RD : reference diameter, MLD : minimal lumen diameter, DS : diameter stenosis, NS : non significant

az - Schatz ASCENT 9
15.5%, 19.6% JAPAN
1123 6 14% ¹⁰⁾

가 1 , di -
ssection 가 1
98.4%

MultiLink 스텐트 8
(percutaneous coronary 22.5%
intervention) 20 12 15.5%
가
가 MultiLink 가

¹⁾²⁾⁸⁾ Palmaz - Schatz
Gianturco Roubin 스텐트 전개 후 고압력 풍선확장과 중등도압력 풍선확
가 , 장의 비교
MultiLink (embo -
lization) (protective sheath)
가 over - the - wire
가
monorail 8 15%
10 30%
(metal su -
rface) strut 가 ,
(elastic membrane)
(uniform expansion) 가
(close apposition)
가 (radial fo -
rce) 가 (side branch occlusion) 14
⁹⁾

WEST 1(West European Stent Trial 1) , WEST 2,
ASCENT(ACS MultiLink Stent Trial), JAPAN
가 , CADILLAC(Controlled Ab -
ciximab and Device Investigation to Lower Late
Angioplasty Complications), SOS(Stent or Surgery
Europe) 가 . WEST 1
102 MultiLink
12%, 30 , 6 , 1 MACE가
5.9%, 17.6%, 18.8% , WEST 2 가 15 16
6 12.9%, 6 MACE가 9.1% .
1040 MultiLink Palm -

가 가 warfarin
ACC Expert Consensus
14 16
¹²⁾
⁴⁾¹¹⁾

가 , 5-7)¹³⁾ Pal - 23)

maz - Schatz 14 16

8 12

가

14-17)

요 약

acute gain

late 연구배경 :

loss가

2 MultiLink

가

18-21)

1 PTCA 1 (1.6%)가 14

14

8

재료 및 방법 :

1997 1 1998 7

acute gain late MultiLink 124

loss net gain (58 ± 9, : =94 : 30), 128

22.5%, 22.9% 6

14

69% (1) 14

MultiLink

(2)

(bias) 결 과 :

1) 58 (47%),

slotted tube 42 (34%), 24 (19%)

Palmaz - Schatz

MultiLink 2) 71 (57%), 53

2 가 (43%) ,

2 slotted tube 88 (69%),

NIR MultiLink Palmaz - Schatz 27 (21%), 가 13

(10%) 가 가 ,

ACC/AHA B1 B2

22) 39% 가

가 3) 1.6%

4) 86 88 (69%) 7.9 ± 2.6
 22.7%
 5) 1 (40, 45%) acute gain 2.33 ± 0.51
 mm 2 (48, 55%) 2.22 ± 0.44 mm
 , 1 late loss 0.95 ± 0.84 mm 2
 0.86 ± 0.73 mm
 net gain

결 론 :

MultiLink

가

가

중심 단어 : MultiLink

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