

급성 심근경색증 환자에서의 Primary Stenting의 중기 추적 결과

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Mid-term Clinical & Angiographic Outcomes of Primary Stenting in Acute Myocardial Infarction

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ABSTRACT

Background and Objectives : The goal of this study was to examine the safety and feasibility of a primary (direct) stenting in acute myocardial infarction (AMI). In the treatment of AMI, Percutaneous transluminal coronary angioplasty (PTCA) has documented superior reperfusion rate and improved clinical outcomes than thrombolytic therapy. However, there are several limitations of PTCA, such as recurrent ischemia in 10 to 15%, reinfarction in 3 to 5% and restenosis in 30 to 50% of patients. There are several reports that, compared with PTCA, the implantation of coronary stent has been shown to reduce angiographic restenosis and improve late clinical outcomes. But in general, stenting has been contraindicated in thrombus containing lesion due to the risk of subacute thrombosis. With advance in technique and the recognition of the importance of adequate platelet inhibition, the incidence of subacute thrombosis has fallen in patients with acute coronary syndrome and thrombus laden lesion. **Methods and Results :** In our study, primary stenting was performed in 42 patients of AMI. There are 6 cases (22.5%) target lesion restenosis during the follow up coronary angiography (150 ± 86day) and no in-hospital death. Three cases (7.1%) of them require revascularization including two re-PTCA and a coronary artery bypass graft for the recurrent ischemic symptoms. There were no reinfarction and death after discharge. Six-months event free survival reate was 85.7%. **Conclusion :** Primary stenting is safe and fe-asible in the majority of patients with AMI and results in excellent mid-term outcomes compared with PTCA. (Korean Circulation J 1999;29(1):28-35)

KEY WORDS : Acute myocardial infarction · Primary stenting.

서 론

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634 - 18

가

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. 1 - 4)

10 15%

30 50% (Fig. 1). 3.0 mm 가 3 cm

1-5) 3 5% 1-8) 9)10) 11)12) 13)14) aspirin 200 mg ticlopidine 250 mg heparin 80 U/kg 18 U/kg/hr activated clot - ting time(ACT) 250 350 ACE Nitrate (target lesion revascularization) 가

대상 및 방법

1997 8 1 1998 7 31 가 1 : 1 (stent optimization) 가 1.0 5 : 1 6 6 24 9 18 14 ± 3 ST lead R 54 51 가 6 1

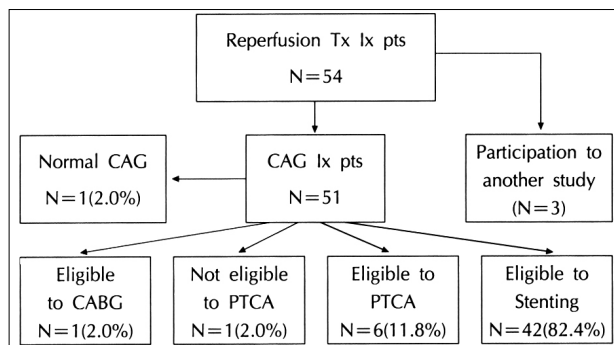


Fig. 1. Patients with acute myocardial infarction indicating for reperfusion therapy during a year.

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23 (54.7%), 1 (2.4%)
 , 25(59.5%) , 13(31.0%) , 4(9.5%) (Table 2).
 (TIMI grade) grade 0가 69.1%, grade 1가 14.3%, grade 2가 7.1%, grade 3가 9.5% (Table 3).
 3.39±0.55 mm , 13.41±6.74 mm , (minimal luminal diameter, MLD) 0.38±0.29 mm .
 13 (30.9%) (Table 2).

Table 2. Angiographic characteristics of patients (n=42)

CAG (%)	
One vessel	25 (59.5)
Two vessel	13 (31.0)
Three vessel	4 (9.5)
Lesion artery (%)	
LAD	18 (42.9)
RCA	23 (54.7)
LCx	1 (2.4)
Lesion length (mm)	13.41 ± 6.74
Reference diameter (mm)	3.39 ± 0.55
Thrombi (%)	13 (30.9)
Final balloon	
Pressure (atm)	14 ± 3
Size (mm)	3.84 ± 0.55

CAG : coronary angiography
 LAD : left anterior descending coronary artery
 RCA : right coronary artery
 LCx : left circumflex coronary artery

Table 3. The immediate results of primary (direct) stenting (n=42)

Pre-MLD (mm)	0.38 ± 0.29
Post-MLD (mm)	3.24 ± 0.55
Pre-TIMI (%)	
0	30 (71.4)
1	5 (11.9)
2	3 (7.1)
3	4 (9.5)
Post-TIMI (%)	
2	5 (11.9)
3	36 (88.1)
Gain (mm)	2.88 ± 0.82
Post-DS (%)	5 ± 7

MLD : minimal luminal diameter
 TIMI : thrombolysis in myocardial infarction
 DS : diameter stenosis

ACS Multilink stent(Guidant, UK)
 13 (31.0%), NIR stent(Scimed, USA) 17 (40.5%),
 JO stent(Jomed, Germany) 1 , CrossFlex(Cordis,
 Netherland) 9 (23.8%), GFx(AVE, Canada) 1
 18 mm 28 (66.7%)
 20 mm 14
 (Table 2). 3.24 ±
 0.55 mm 2.88 ± 0.82 mm
 , 88.1% TIMI grade 3
 11.9% grade 2 .

10% 가 83.3% ,
 30% (Table 3).
 1 B
 가 , 3 slow flow 1
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 glycoprotein b/ a abci -
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 (Table 4). 2 3
 8 ± 3
 (185 ± 95) ,
 150 ± 86
 . 42 22 (52%) 6
 ,
 1.3 ± 0.53 mm, loss index 0.47 ± 0.21
 . 50% 6
 25% (Fig. 2).
 3 (7.1%)

Table 4. Six months clinical and angiographic results of primary stenting (n=42)

TLR (%)	3 (7.1)
Loss (mm)	1.30 ± 0.53
Loss index	0.47 ± 0.21
Restenosis rate (%)	6/22 (25)
Recurrent ischemia (%)	5 (11.9)
Reinfarction (%)	1 (2.4)
Death	0
Event free survival (%)	85.7
CAG follow up rate (%)	22 (57)

TLR : target lesion revascularization
 CAG : coronary angiography

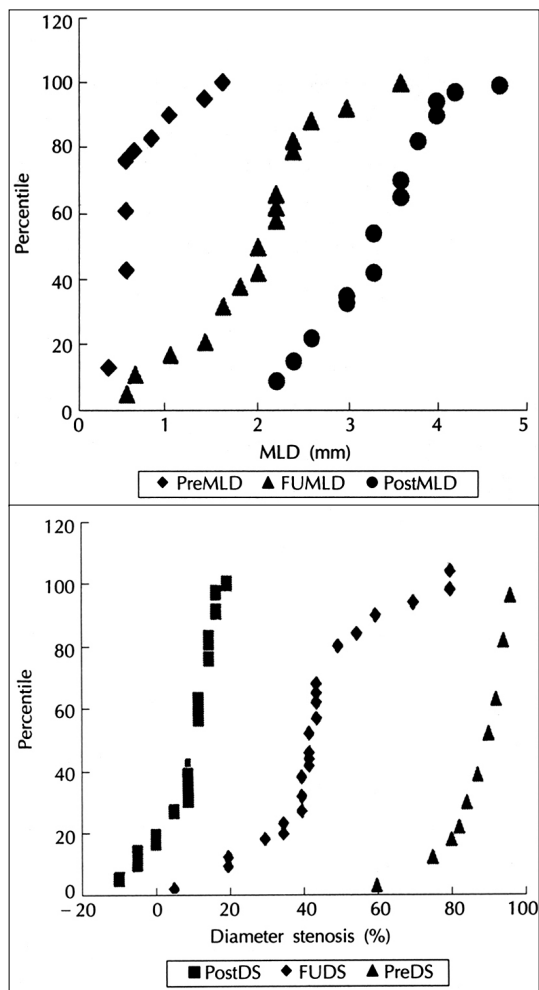


Fig. 2. Minimum lumen diameter and percent diameter stenosis before, after stenting and at 6-months follow-up, expressed as a cumulative distribution function.

(PTCA 2 , CABG 1)

 $1, 2$

(Table 4).

고찰

42

100%
25%

, 6

86% 7.1%

가

(TIMI 3 flow rate) 55%

18)19)

aver 20) 가

1 - 4) We -

가 .²¹⁾

10 15%

3 5%

1 - 5)

1 - 6)

1 - 6)

30 50%

20%

가

11)12)

가 , 가

.¹³⁾¹⁴⁾ Rodriguez ²²⁾

가 ,

가 ,

31

3% ,

10%

17%

. Fernando 23)

가 1%

가

42 (100%) 1)
2)
, 1
3
glycoprotein b/ a abcixi -
mab ,
3) 6
3 (7.1%) (PTCA 2 , CA -
BG 1)
85.7% , 4) 6
25% .

결 론 :

중심 단어 :

REFERENCES

- Grines CL, Browne KR, Macro J. *A Comparison of primary angioplasty with thrombolytic therapy for acute myocardial infarction*. *N Eng J Med* 1993;328:673-9.
- Stone GW, Grines CL, Brown KF. *Predictors of in-hospital and 6 month outcome after acute myocardial infarction in the reperfusion era: The primary angioplasty in myocardial infarction (PAMI) trial*. *J Am Coll Cardiol* 1995;25:370-7.
- Zijlstra F, DeBoer MJ, Hoorntje JCA. *A comparison of immediate coronary angioplasty with intravenous streptokinase in acute myocardial infarction*. *N Eng J Med* 1993;328:680-4.
- Michel KB, Yusuf S. *Dose PTCA in acute myocardial infarction affect mortality and reinfarction rate? A quantitative (meta-analysis) of randomized clinical trials*. *Circulation* 1995;91:476-85.
- Stone GW, Grines CL, Browne KF. *Implications of recurrent ischemia after reperfusion therapy in acute myocardial infarction: A comparison of thrombolytic therapy and coronary angioplasty*. *J Am Coll Cardiol* 1995;26:66-72.
- O'Neill WW, Brodie BR, Ivanhoe R. *Primary coronary angioplasty for acute myocardial infarction (the primary angioplasty registry)*. *Am J Cardiol* 1994;73:627-34.
- Stone GW, Marsalese D, Brodie BR. *A prospective, randomized evaluation of prophylactic intraaortic balloon counterpulsation in high risk patients with acute myocardial infarction treated with primary angioplasty*. *J Am Coll Cardiol* 1997;29:1459-67.
- Ohman EM, Goerge BS, White CJ. *For the randomized IABP study group. Use of aortic counterpulsation to improve sustained coronary artery patency during acute myocardial infarction: Results of a randomized trial*. *Circulation* 1994;90:792-9.
- Brodie BR, Grines CL, Ivanhoe R. *Six month clinical and angiographic follow up after direct angioplasty for acute myocardial infarction*. *Circulation* 1994;25:156-62.
- Nakagawa Y, Iwasaki Y, Kimura T. *Serial angiographic follow up after successful direct angioplasty for acute myocardial infarction*. *Am J Cardiol* 1996;78:980-4.
- Fishman DL, Leon MB, Baim DS. *A randomized comparison of coronary stent placement and balloon angioplasty in the treatment of coronary artery disease*. *N Eng J Med* 1994;331:496-501.
- Versaci F, Gaspardon A, Tomai F. *A comparison of coronary artery stenting with angioplasty for isolated stenosis of the proximal left anterior descending artery*. *N Eng J Med* 1997;336:817-22.
- Schatz RA, Baim DS, Liu MW. *Clinical experience with the Palmaz-Schatz coronary stent: Initial results of a multicenter trial*. *Circulation* 1991;83:148-61.
- Agrawal SK, Ho DSV, Liu MW. *Predictors of thrombotic complication after placement of a flexible coil stent*. *Am J Cardiol* 1994;73:1216-9.
- Mak HK, Belli G, Ellis DJ. *Subacute stent thrombosis; Evolving issue and current concepts*. *J Am Coll Cardiol* 1996;27:494-503.
- Alfonso F, Rodriguez P, Phillips P. *Clinical and angiographic implication of coronary stenting in thrombus containing lesion*. *J Am Coll Cardiol* 1997;29:725-33.
- The TIMI Study Group. *The thrombolysis in myocardial infarction (TIMI) trial: Phase I findings*. *N Eng J Med* 1985;312:932-6.
- Lavie CJ, Gersh BJ, Chesebro JH. *Reperfusion in acute myocardial infarction*. *Mayo Clin Proc* 1990;65:549-55.
- Tiefenbrunn AJ, Sobel BE. *The impact of coronary thrombolysis on myocardial infarction*. *Fibrinolysis* 1989;3: 1-6.
- Weaver WD, Simes RJ, Ellis SG, Grines CL, Zijlstra F, et al. *Comparison of primary coronary angioplasty and intravenous thrombolytic therapy for acute myocardial infarction: A quantitative review*. *JAMA* 1997;278:2093-8.
- Stone GW, Grines CL, Rothbaum D, Browne KF, O'Keefe J, Overlie P, et al. *Analysis of the relative costs and effectiveness of primary angioplasty in myocardial infarction (PAMI) trial*. *J Am Coll Cardiol* 1997;29:901-7.
- Rodriguez AE, Fernandez M, Santaero O, Larribau M, Bernardi V, Castano H, et al. *Coronary stenting in patients undergoing percutaneous transluminal coronary angioplasty during acute myocardial infarction*. *Am J Cardiol* 1996;77:685-9.
- Fernando A, Pedro R, Paul P, Javier G, Rosana H, Javier S, et al. *Clinical and angiographic implications of coronary stenting in thrombus-containing lesions*. *J Am Coll Cardiol* 1997;29:725-33.
- Badimon L, Badimon JJ. *Mechanism of arterial thrombus in nonparallel streamlines: Platelet thrombi grow at the apex of stenotic severely injury vessel wall: Experimental study in the pig model*. *J Clin Invest* 1989;84:1134-44.
- Kaul U, Agarwal R, Jain P, Wasir H. *Safety and efficacy of intracoronary stenting for thrombus containing lesions*. *Am J Cardiol* 1996;77:425-7.

- 26) Grinstead WC, Reizner AE, Churchill DA. *Intracoronary thrombus prior to stenting: Impact on angiographic success and clinical outcome. J Am Coll Cardiol* 1993;21 suppl A:30A.
- 27) Romero M, Medinala, Suarez de Lezo J. *Elective stent placement in acute coronary syndromes induced by thrombus containing lesion. J Am Coll Cardiol* 1996;27 suppl A:69A.
- 28) Elias GC, Christian S, Thierry C, Khaldoun BH, Laurent R, Xavier F, et al. *Stent implantation in acute myocardial infarction. Am J Cardiol* 1996;77:451-4.
- 29) Roubin GS, Cannon AD, Agrawal SK. *Intracoronary stenting for acute and threatened closure complicating percutaneous transluminal coronary angioplasty. Circulation* 1992;85:916-27.
- 30) Glick A, Kornowski R, Michowich Y, Koifman B, Roth A, Laniado S, et al. *Reduction of reinfarction and angina with use of low-molecular weight heparin therapy after streptokinase (and heparin) in acute myocardial infarction. Am J Cardiol* 1996;77:1145-8.
- 31) Ohman EM, Kleiman NS, Gacioch G, Worley SJ, Navetta FI, Kereiakes D. *Combined accelerated tissue plasminogen activator and platelet glycoprotein b/ a integrin receptor blockade with integrin in acute myocardial infarction: result of randomized, placebo controlled, dose ranging trial. Circulation* 1997;95:846-54.
- 32) Nasser M, Julio L, Miltiadis L, Asad P, Lari H, Igor FP. *Comparison of primary coronary stenting to primary balloon angioplasty with stent bailout for the treatment of patients with acute myocardial infarction. Am J Cardiol* 1998;81:957-63.
- 33) David A, Renato V, Piergiovanni B, Giovanni MS, Mario L, Leonardo B, et al. *Direct angioplasty and stenting of the infarct-related artery in acute myocardial infarction. Am J Cardiol* 1996 ;78:568-71.
- 34) Suryapranata H, van't Hof AWJ, Hoorntje JCA, de Boer MJ, Zijlstra F. *Randomized comparison of coronary stenting with balloon angioplasty in selected patients with acute myocardial infarction. Circulation* 1998;97:2502-5.
- 35) Stone GW, Brodie BR, Griffin JJ, Morice MC, Costantini C, Goar GF, et al. *Prospective, multicenter study of the safety and feasibility of primary stenting in acute myocardial infarction: In-hospital and 30-day results of the PAMI stent pilot trial. J Am Coll Cardiol* 1998;31:23-30.