

관동맥 만성완전폐쇄에서 시행한 관동맥성형술의 결과

최락경 · 원태경 · 문건식 · 한춘호 · 신은석
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Results of Percutaneous Transluminal Coronary Angioplasty of Chronic Total Occlusion

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ABSTRACT

Background and Objective : Percutaneous transluminal coronary angioplasty of chronic total occlusion has been limited by a relatively low success rate and a high restenosis rate. This study investigated procedural outcome, factors predictive of procedural success and safety of coronary angioplasty for chronic total coronary occlusion. **Materials and Methods :** The study population was composed of 45 lesions attempting PTCA with or without stent implantation for recanalization of chronic total coronary occlusion between January 1997 and July 1999. The clinical and angiographic data of the 45 lesions were reviewed. The results of successful PTCA in 28 lesions were compared with those in 17 lesions whose PTCA was failed. **Results :** The overall success of balloon angioplasty and stenting was achieved in 28 lesions (62.2%) and did not differ significantly by clinical variables. The most common cause of failure of balloon angioplasty was inability to pass the guide wire across the occlusion (14 of 23 lesions, 61%). Procedural success was more common in patients with occlusions with a tapered entry configuration (77.2% vs. 47.8%, $p = 0.042$), with lesions without side branches (82.3% vs. 50%, $p = 0.03$). Multiple logistic regression analysis identified the absence of side branch ($p < 0.01$) and the presence of a tapered entry configuration ($p < 0.05$) as independent predictors of procedural success. One case (2.2%) needed emergency coronary bypass surgery after failure to recanalize the occluded vessel. There was no Q wave acute myocardial infarction, death. **Conclusions :** The favorable cases (>60%) of chronic total coronary occlusions can be successfully dilated by balloon angioplasty with or without stent implantation, with a major complication rate of 2.2%. Therefore, with careful patient selection, we need to try the aggressive recanalization for chronic total coronary occlusion. (**Korean Circulation J 2000;30(4):416-423**)

KEY WORDS : Percutaneous transluminal coronary angioplasty (PTCA) · Chronic total occlusion.

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서 론
 1978 Grüntzig¹⁾²⁾ (TIMI 0) ,
 1 ~3 (Early chro-
 nic), 3 (Late chronic)
 .
 50% , TIMI flow 3
 가 [NHLBI Type C
 (collateral ve- (dissection), ,
 90%]
 ssels) 가 ,
 Tapered,
 Abrupt
 가
³⁾
 Cohen Rentrop
⁴⁻⁶⁾ 0 3
 Q (CPK
⁷⁻⁹⁾ MB isoenzyme)가 3
 50%
 가 ,
 관동맥성형술
 대상 및 방법
 대 상
 1997 1 1999 7
 43 45 () 28
 17 1.5 mm 2.0 mm
 방 법
 통계처리
 (ma-
 nual caliper) 2 가
 SPSS Chi -
 square test Student's t - test ,
 정 의
 (mul-
 tiple logistic regression analysis)
 p<0.05

Table 1. Baseline clinical characteristics and clinical variables not related to procedural success

| Variable | Success (n = 28) | Failure (n = 17) | P value* |
|---------------------------|------------------|------------------|----------|
| M/F (n) | 22/6 | 11/6 | NS |
| Age (yr) | 58.6 ± 10.4 | 58.8 ± 7.6 | NS |
| BMI (kg/m ²) | 24.9 ± 2.9 | 25.1 ± 3.1 | NS |
| LVEF (%) | 59.3 ± 12.4 | 50.9 ± 18 | NS |
| Previous MI | 2 | 7 | NS |
| Previous CVD | 2 | 1 | NS |
| Previous CABG | 2 | 1 | NS |
| Family history (CAD, CVD) | 2 | 0 | NS |
| Smoker | 13 | 7 | NS |
| Hypertension | 17 | 10 | NS |
| Diabetes | 7 | 3 | NS |
| Hypercholesterolemia | 11 | 6 | NS |
| Duration of CTO | | | |
| Early chronic | 13 | 4 | |
| Late chronic | 15 | 13 | NS |

Values are mean ± SD. *comparing values in the success and failure groups. NS, not significant. M/F, male/female. BMI, body mass index. LVEF, left ventricular ejection fraction. MI, myocardial infarction. CVD, cerebrovascular disease. CABG, coronary artery bypass grafting. CTO, chronic total occlusion.

결 과

대상환자의 임상적 특징 (Table 1)

45명 중 28명 (62.2%)은 성공적으로 시술을 받았고, 17명 (37.8%)은 실패하였다. 성공군의 평균 연령은 58.6 ± 10.4세, 실패군의 평균 연령은 58.8 ± 7.6세였다. BMI는 성공군에서 24.9 ± 2.9 kg/m², 실패군에서 25.1 ± 3.1 kg/m²로 유의한 차이가 없었다. LVEF는 성공군에서 59.3 ± 12.4%, 실패군에서 50.9 ± 18%로 유의한 차이가 없었다. 이전 MI, CVD, CABG, 가족력 (CAD, CVD), 흡연, 고혈압, 당뇨병, 고지혈증 등 임상적 특성은 두 군 간에 유의한 차이가 없었다. CTO의 지속 기간은 성공군에서 13명 (46.4%)이 만성 초기, 15명 (53.6%)이 만성 후기였으며, 실패군에서는 4명 (23.5%)이 만성 초기, 13명 (76.5%)이 만성 후기였다. 두 군 간에 CTO의 지속 기간에 따른 성공률의 차이는 없었다.

CCS Class는 성공군에서 1명 (3.6%)이 Class 1, 27명 (96.4%)이 Class 2 또는 3이었으며, 실패군에서는 2명 (11.8%)이 Class 1, 15명 (88.2%)이 Class 2 또는 3이었다. 성공군에서 Class 1의 비율은 3.6%, 실패군에서는 11.8%로 유의한 차이가 없었다.

성공률과 실패원인 (Figs. 1 and 2)

45명 중 28명 (62.2%)은 성공적으로 시술을 받았고, 17명 (37.8%)은 실패하였다. 성공률은 62.2% (28/45)로, 실패 원인은 17명 (37.8%)이었다. 실패 원인은 Primary coronary stenting 40% (6명), Bail-out stenting 13% (2명), Lone balloon angioplasty 9% (1명), Procedural failure 38% (6명)로 나타났다.

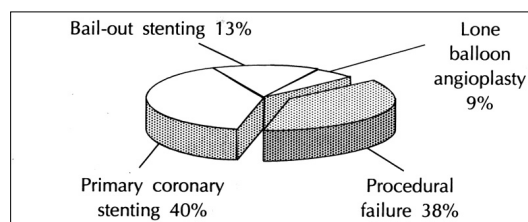


Fig. 1. Outcome of coronary angioplasty in chronic total occlusions. Total success rate = 62.2% (28 cases).

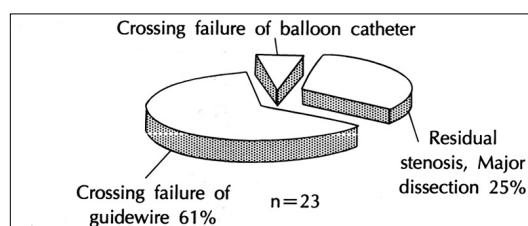


Fig. 2. Cause of failure of attempted balloon angioplasty in chronic total occlusions.

Table 2. Angiographic variables related to procedural success

| Variable | Attempted No. | Success No. (%) | P value |
|--------------------------|---------------|-----------------|---------|
| Entry morphology | | | |
| Tapered | 22 | 17 (77.2) | |
| Abrupt | 23 | 11 (47.8) | 0.042 |
| Side branch at occlusion | | | |
| Present | 28 | 14 (50) | |
| Absent | 17 | 14 (82.3) | 0.03 |

성공률과 실패원인 (Figs. 1 and 2)은 성공률 62.2% (28/45)로, 실패 원인은 17명 (37.8%)이었다. 실패 원인은 Primary coronary stenting 40% (6명), Bail-out stenting 13% (2명), Lone balloon angioplasty 9% (1명), Procedural failure 38% (6명)로 나타났다.

성공 예측인자

(Table 1)

대상환자의 임상적 특징 (Table 1)은 성공률과 실패원인 (Figs. 1 and 2)은 성공률 62.2% (28/45)로, 실패 원인은 17명 (37.8%)이었다. 실패 원인은 Primary coronary stenting 40% (6명), Bail-out stenting 13% (2명), Lone balloon angioplasty 9% (1명), Procedural failure 38% (6명)로 나타났다.

Table 3-1. Angiographic variables not related to procedural success

| Variable | Attempted No. | Success No. (%) | P value |
|-----------------------------|---------------|-----------------|---------|
| Lesion length | | | |
| 1.5 cm | 33 | 22 (66.6) | NS |
| > 1.5 cm | 12 | 6 (50) | |
| Bridging collateral vessels | | | |
| Present | 13 | 6 (46.1) | NS |
| Absent | 32 | 22 (68.7) | |
| Calcification at occlusion | | | |
| Present | 10 | 4 (40) | NS |
| Absent | 35 | 24 (68.5) | |
| Extent of CAD | | | |
| 1 vessel | 18 | 13 (72.2) | NS |
| 2 vessel | 13 | 8 (61.5) | |
| 3 vessel | 14 | 7 (50) | |

CAD, coronary artery disease. NS, not significant.

Table 3-2. Angiographic variables not related to procedural success

| Variable | Attempted No. | Success No. (%) | P value |
|----------------------------|---------------|-----------------|---------|
| Reference vessel diameter | | | |
| < 3 mm | 18 | 13 (72.2) | NS |
| > 3 mm | 27 | 15 (55.5) | |
| Collateral filling grading | | | |
| 0 | 3 | 1 (33.3) | NS |
| 1 | 10 | 6 (60) | |
| 2 | 18 | 12 (66.6) | |
| 3 | 14 | 9 (64.3) | |
| Coronary artery | | | |
| LAD | 23 | 15 (65.2) | NS |
| LCX | 7 | 5 (71.4) | |
| RCA | 15 | 8 (53.3) | |

LAD, left anterior descending artery. LCX, left circumflex artery. RCA, right coronary artery. NS, not significant. NO., number of patients

(Side branch)가 28 14
(50%), 가 17 14 (82.3%)
가
(p=0.03). (multiple logi -
stic regression analysis) (p<
0.05) (p<0.01)
(1.5 cm
(Bridging collateral vessels)
(Ex -
tent of CAD) , (3 mm) ,
(Collateral filling) ,
가 ,
가 , 가
가 , 1 ,
가

합병증

,
(CPK MB isoenzyme) (<3x)
8.8%(4), Q (>3x) 2.2%(1),
2.2%(1)

Q

고 찰

20~40% 10%
10)11)
12)9)
13)

14)

9)

5)

가

가

8)15)16)

17)

1

(Table 2 and 3)
가 Tapered 22 17 (77.2%),
Abrupt 23 11 (47.8%)
가 (p=0.042),

TIMI(Thrombolysis in Myocardial Infarction) flow 0 1988 100 104 . Stone ²³⁾
 TIMI flow 1 , 1 3 2 ~9 , ; 12 ± 20) (:
 (Tapered, Abrupt) 가
 1
 , 3 , 3 , Maiello ²⁴⁾
 1 , 365
 (+) (3) , (1.5
 62.2% , 48.8% cm) , (Tapered, Ab -
 18 - 20) (47 ~73%) rupt) , 가
 Tan ²⁵⁾
 가 , 312 가
 . Kel - 가 Abrupt ,
 sey ²¹⁾ 가 3 , 가 3 mm
 (high grade stenosis)
 가 , Jollis ²²⁾ Katsuragawa ²⁶⁾ 3
 64 10 Tapered
 (operator volume) (1.5 cm) (loose
 . Stone ²³⁾ Maiello ²⁴⁾ fibrous tissue) (160~230 μ
 (operator learning curve) m) (recanalization) , Abrupt
 (>1.5 cm)
 가 4 ,
 , Tapered
 61%가 가
 , 13%가 , 26%가
 50% (Major diss -
 ection) . Ruocco ⁶⁾ 285
 87
 88.5%가 , 9%가 (CPK MB isoenzyme) (<3x) 8.8%(4
 , 2.2% , Mel -) , Q (>3x) 2.2%(1) ,
 chior ⁵⁾ 100 2.2%(1) . Q
 44 68.2% . Berger ²⁰⁾
 (30)가 , 9%(4)가 72 (TIMI 0) 139
 , 22.7%(10)가 Q (1.4%) ,
 (Major dissection) (2.9%) , (0%) , (0%) ,
 (0%) , Ruocco ⁶⁾
 (Tapered, Abrupt) (1 vessel disease) 2.1
 (TIMI 0) 142 Q
 (1%) , (0%) , (2%)
 (Multiple lo -
 gistic regression analysis) .

25)27) 가 3

62%

가

(44~77%) 가

요 약

가 연구목적 :

가

28)29)

50%

30)31)

9 7.8 ± 2.4 (

55%) 45

8 28

. Sirnes 30) 175 ± 48 97% 17

2

113 50%

결 과 :

1) / 22/6 , / 11/

(Palmaz - Schatz) 32%, 6 58.6 ± 10.4 ,

74% 58.8 ± 7.6 . 45 20%(9

, Buller 31) 6 95.6%) , 6%(3)

3 392

50%

2) 45 28 62.2%

(he - 55%, 22

parin - coated Palmaz - Schatz) 70% 48.8% , 61%가

가 , 4 , 26%가 50%

가 (Major dissection)

3)
(p<0.05) , (p<0.01)
4)
(CPK MB isoenzyme) (<3x)
8.8%(4), Q (>3x) 2.2%(1),
2.2%(1)
Q
결 론 :
(62%)
(2.2%)
중심 단어 :

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