

혈관내 초음파로 확인된 스텐트내 경미한 죽상반 돌출의 장기 추적 결과

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Long-term Outcome of Minor Plaque Prolapsed within Stents Documented with Intravascular Ultrasound

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ABSTRACT

Background : The direct relationship between minor plaque prolapsed within stents and late in-stent restenosis is unknown. Therefore, we evaluated Our objective was to evaluate the impact of a minor plaque prolapse on late angiographic in-stent restenosis. **Materials and Methods** : Intravascular ultrasound (IVUS) guided single coronary stenting was successfully performed in 384 consecutive patients with 407 native coronary lesions. Six-month follow-up angiogram was performed in 315 patients (82.0%) with 334 lesions (82.1%). Minor plaque prolapsed prolapses within the stent occurred in 75 of 334 lesions (22.5%). Results The results were evaluated using angiographic and IVUS methodology. **Results** : The development of a minor plaque prolapse was significantly associated with infarct-related artery ($p = 0.000$) and smaller pre-intervention minimal lumen diameter ($p = 0.001$). The overall angiographic restenosis rate was 23.1% (77/334) ; 21.3% (16/75) in the lesions with plaque prolapse vs. 23.6% (61/259) in the lesions without plaque prolapse ($p = 0.806$). **Conclusion** : Minor plaque prolapsed prolapses within stents might not be associated with late angiographic in-stent restenosis. (**Korean Circulation J 2001;31(2):159-165**)

KEY WORDS : Intravascular ultrasound · Plaque · Stent.

서 론

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travascular ultrasound, IVUS (cross-sectional image) (in - 71)

스트েন্ট 시술

가 가 (4-6)

12 15 mm tantalum Cordis
stent, 84 CrossFlex stent(74
(plaque) strut (prolapse) 15 mm 10 25 mm), 118 GFX
(native coronary arteries) stent(16 12 mm, 82 18 mm 20
1)
24 mm), 1 22 mm Crown stent, 2 15
mm DivYsio stent, 5 20 mm Gianturco - Ro -
2)3) IVUS ubin II stent, 3 15 mm Palmaz - Schatz stent,
3 Multi link stent(2 25 mm 1
15 mm), 101 NIR stent(4 9 mm, 66
가 16 mm 31 25 mm) 5
가 15 mm Wiktor stent가
(angiographic optimization)

(IVUS optimization of stenting)

가 1) (minimum stent lumen
cross sectional area)
방법 (reference vessel) 80%
, 2) 3)
(full lesion coverage)

대 상 IVUS optimization of stenting
384 , 407
가 IVUS
1, 3 6
6 6 (infarct -
315 (82.0%), related artery) 54
334 (82.1%), 334 7 10
2 (infarct - related artery)
1) 259 , ,
54 25
2) 75 (13 , 12
가) 12
가 70% direct stenting
(left main (250 mg a day for indefinitely) ticlopidine
coronary artery disease), (saph - (250 mg twice per day for 1 month) cilostazol
enous vein disease), ,
(69 , 7)

정량적 관동맥 조영소건의 분석(Quantitative coronary angiographic analysis, QCA)

0.2 mg

0.5 mm

off - line

1/2 inch s - VHS tape

ANCOR system(V2.0, Siemens, Solna, Sweden)

정량적 혈관내 초음파 분석(Quantitative IVUS measurements)

IVUS

catheter)

(guiding

(external elastic membrane, EEM),

+ (plaque + media, P + M)

50%

⁸⁾⁹⁾ EEM

(adventitia)

, P + M (,

IVUS 검사 방법

IVUS

0.2 mg

) EEM (cross - sectional area, CSA)

(lumen)

(plaque burden) P + M

trasound catheter)

(target lesion site)

EEM

10 mm

aorto - ostial junction

IVUS

IV -

US (Boston Scientific/Cardiovascular Imaging

가

System, Inc., San Jose, CA)

IVUS

10 mm

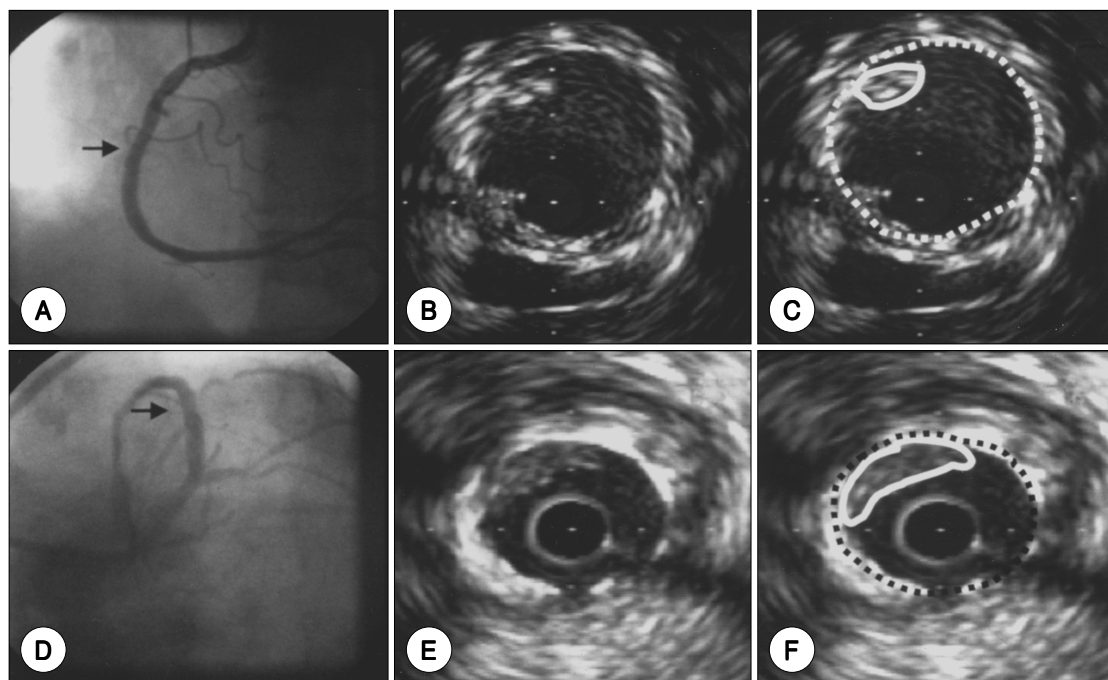


Fig. 1. The coronary angiogram showed successful GFX stent implantation (arrow) at mid-portion of right coronary artery (A) and successful CrossFlex stent implantation (arrow) at proximal left anterior descending artery (D). Intravascular ultrasound images showed minor plaque (solid circle) within stent (dotted circle). B and C (GFX stent) are identical, and E and F (CrossFlex stent) are also identical.

가 (minor plaque prolapse) 25%

Fig. 1 plaque prolapse CSA (solid circle in Fig. 1) , plaque prolapse burden plaque prolapse CSA (do - tted circle in Fig. 1) 100 (residual stent CSA) stent CSA plaque CSA

통계적 분석 paired t test Chi - square Fisher's exact test p 0.05

가

결 과

Table 1 . 334 75 (22. 5%) Tantalum Cordis 12 2 (16.7%), CrossFlex

Table 1. Baseline clinical characteristics (%)

Number of patients	315
Age (years)	57 ± 9
Men	232 (73.7)
Prior myocardial infarction	29 (9.2)
Systemic hypertension	114 (36.2)
Diabetes mellitus	42 (13.3)
Hypercholesterolemia (≥ 240 mg/dl)	35 (11.1)
Cigarette smoking	150 (47.6)
Clinical presentation	
Stable angina	76 (24.1)
Unstable angina	176 (55.9)
Acute myocardial infarction	63 (20.0)
Number of narrowed coronary arteries	
1	217 (68.9)
2	65 (20.6)
3	33 (10.5)

84 20 (23.8%), GFX 118 24 (20.3%), Giantirco - Roubin II 5 3 (60.0%), Palmaz - Schatz 3 1 (33.3%), NIR 101 22 (21.8%), Wiktor 5 3 (60. 0%)

Table 2

(p = 0.000) (p = 0.001) IVUS Table 3 (plaque prolapse CSA) $0.7 \pm 0.4 \text{ mm}^2$ (0.1~1.8 mm^2) , (plaque prolapse burden) $8.6 \pm 3.9\%$ (2.1~23.4%) 23.1%(77/334) , 21.3% (16/75), 23.6%(61/259) (p=0.806).

Table 2. Baseline angiographic characteristics and procedural results (%)

	Prolapse	No prolapse	p
Number of lesions	75	259	
Coronary artery dilated			0.810
Left anterior descending	46 (61.3)	154 (59.5)	
Left circumflex	8 (10.7)	35 (13.5)	
Right	21 (28.0)	70 (27.0)	
Restenotic lesions	1 (1.3)	10 (3.9)	0.250
Infarct-related artery	26 (34.7)	28 (10.8)	0.000
Lesion morphology			0.759
A	19 (25.3)	51 (19.7)	
B1	17 (22.7)	60 (23.2)	
B2	23 (30.7)	86 (33.2)	
C	16 (21.3)	62 (23.9)	
Mean stent length (mm)	17.5 ± 3.7	17.7 ± 3.8	0.425
Reference vessel diameter (mm)	3.4 ± 0.5	3.3 ± 0.5	0.285
Minimal lumen diameter (mm)			
Pre-intervention	0.6 ± 0.4	0.8 ± 0.5	0.001
Post-intervention	3.3 ± 0.5	3.3 ± 0.5	0.771
Follow-up	2.0 ± 0.7	2.0 ± 0.8	0.944
Balloon-to-artery ratio	1.17 ± 0.12	1.12 ± 0.13	0.492
Pressure (atm)	13.5 ± 3.4	12.8 ± 3.3	0.218

Table 3. Post-intervention intravascular ultrasound findings

	Prolapse	No prolapse	p
Proximal reference segment			
EEM CSA (mm ²)	16.1 ± 3.2	15.9 ± 3.5	0.770
Lumen CSA (mm ²)	9.1 ± 2.2	9.2 ± 2.6	0.414
Lumen MLD (mm)	3.1 ± 0.4	3.2 ± 0.5	0.740
Plaque burden (%)	43 ± 8	42 ± 10	0.269
Lesion segment			
Lumen CSA (mm ²)	7.5 ± 1.7	7.4 ± 1.8	0.814
Lumen MLD (mm)	2.8 ± 0.4	2.9 ± 1.2	0.277
Prolapsed segment			
Stent CSA (mm ²)	8.6 ± 2.2		
Plaque prolapse CSA (mm ²)	0.7 ± 0.4 (0.1 - 1.8)		
Residual stent CSA (mm ²)	7.9 ± 2.0		
Plaque prolapse burden (%)	8.6 ± 3.9 (2.1 - 23.4)		
Distal reference segment			
EEM CSA (mm ²)	14.1 ± 3.8	13.9 ± 3.7	0.634
Lumen CSA (mm ²)	8.5 ± 2.3	8.6 ± 2.5	0.743
Lumen MLD (mm)	3.0 ± 0.4	3.0 ± 0.5	0.841
Plaque burden (%)	39 ± 10	38 ± 10	0.283

CSA : cross-sectional area, EEM : external elastic membrane, MLD : minimal lumen diameter.

(22.5%).

고 찰

본 연구는 Brack 가 strut 3 (GFX, CrossFlex¹⁾ and NIR stent) 20~24% , 3 IVUS (thrombus) (soft plaque)¹¹⁾ (fibrous) (calcified plaque) strut

10) Wiktor 1 , 11) Palmaz - Schatz 1

Ponde 1

가

가

가

IVUS

IVUS

strut, IVUS

가 plaque burden 가 가

요 약

연구배경 :

plaque burden 가

가 가

방 법 :

(IVUS)

384, 407

. 6

315 (82.0%) 334 (82.1%)

(intimal hyperplasia for -

mation)

³⁾

0.7 mm²

plaque prolapse burden 8.6%

결 과 :

334

75 (22.5%)

(p=0.000)

가

(p=0.001).

23.1%(77/334)

21.3%(16/75),

23.6%(61/259) (p=0.806).

결 론 :

가

가

중심 단어 :

■ 본 연구의 제한점

가

가

IVUS

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