

관상동맥질환에서 요골동맥을 경유한 중재술 : 대퇴동맥을 경유한 중재술과의 비교 연구

김무현 · 차광수 · 김종성

Transradial Interventions in Coronary Artery Disease : Comparison with Transfemoral Interventions

Moo Hyun Kim, MD, Kwang Soo Cha, MD and Jong Seong Kim, MD

Department of Internal Medicine, College of Medicine, Dong-A University, Pusan, Korea

ABSTRACT

Background : Transradial coronary intervention was introduced recently. It has less bleeding and vascular complications and advantage of early ambulation. **Methods** : We compared 142 transradial coronary interventions (101 stents, 56 balloon angioplasty and 18 rotablation) with 120 transfemoral interventions in 230 patients from January to August 1998. **Results** : Overall success rate was not different between two approaches (92% vs 89%), but smaller sized sheath and less amount of contrast agent were required in transradial interventions compared to transfemoral interventions. Conventional guiding catheters which are used in transfemoral approach were used in most cases (94%) of transradial interventions. Judkins left 3.5 (in stead of JL4.0 in femoral approach) and Judkins right 4.0 were the most frequently used guiding catheters in transradial approach. Stent implantation was successfully done in 99 out of 101 lesions (98%) in transradial intervention and 76 out of 78 lesions (97%) in transfemoral intervention. Rotational atherectomy and primary balloon angioplasty or stenting were done successfully in 10 -20% of the patients in both groups. All procedures were done successfully without any major procedure-related complications (myocardial infarction, death, bypass surgery) or major vascular complications in both groups. During the clinical follow-up of transradial group, punctured arteries showed 10% incidence of radial artery pulse weakness with 3% of pulse loss. **Conclusion** : Transradial approach is useful another feasible route for coronary interventions. The feasibility of primary balloon angioplasty or stenting and rotational atherectomy by transradial approach should be evaluated in the future. (*Korean Circulation J* 1998;28(12):1941-1952)

KEY WORDS : Transradial intervention · Stent · Rotational atherectomy.

서 론

(coronary intervention)

(percutaneous transluminal coronary angioplasty : PTCA)

: 1998 11 11
: 1999 2 5
: , 602 - 715 3가 1
: (051) 240 - 5620, 21 · : (051) 242 - 1449
E - mail : kmh60@damc.dauhosp.or.kr

가 , 1989 , (Campeau¹⁾가 , 1995 Kiemeneij²⁾³⁾), 가 , 가 가 . 가 가 . 가 Park⁴⁾ Yoon⁵⁾ . 가 . 시술전 및 시술중 약물투여 2 3 aspirin(100 200 mg/day) ticlopidine (500 mg/day) . verapamil 2 mg/dl, nitro - glycerine 0.2 mg/dl (cocktail sol - ution), heparin 10,000 ACT(activated coagulation time) 300 . 대상 및 방법 동맥의 천자 및 유도초(Arterial sheath)의 삽입 (hype - 대상환자 1998 2 8 127 (142) 2% 1998 1 8 103 (120) (Fig. 1). 20 gauge (Cook, USA) (He - mostasis introducer, DAIG corp., USA Tra - nsradial kit, 0.019 11 cm, Cordis corp., USA) 가 181 가 49 (20 gauge) 91 , 118 . 5 가 (0.025 50 cm 0.019 50 cm) 15 . 2 가 20 gauge (Allen test)가 . (, 10 6, 7 가), 8 French(Fr) . 23 cm 가 (intraaortic balloon pump, IABP)

(elbow joint)

가

6 Fr

(: deep seating or deep in -
tubation technique)(Fig. 2).

cm 가 one - piece

18 Gauge (Cook, USA)

(0.038 , 45 cm)

고속회전 죽상반제거술(Rotational atherectomy)

7 Fr over - the - wire

PTCA

가

관상동맥 중재술의 유도도관의 선택(Selection of guiding catheter)

Judkins (JL4 &JR4) 1

Amplatz

7 8 Fr

(Judkins, Amplatz, multi - pur -
pose)

JL3.5, JR4

(good alignm -
가 5,000

ent)

(rotational atherectomy) 3.5 mm 1 15 30 2 4

7 8

가

Fr 6 Fr 0.25 0.5 mm

가 PTCA

관상동맥 풍선성형술 및 스텐트 삽입술 PTCA

(premounted)

(bare) (hand cri -

mped) 5 6 ,

10 12

(12)

20%

가 6 용어의 정의

Fr (post -

가 procedural percent diameter stenosis) 50%

(, ,)

(profile)가 가(CK -

MB) 가 2

가 가 가

가 . 가 , 3
(creatinine <1.3 mg/dl)
creatinine 1.4 mg/dl 가
creatinine 1.3 cr - 통계 및 분석
eatinine 0.5 mg/dl 가 . Macintosh Statview version 4.5
동맥유도초의 제거와 지혈 (%) Student's t-test

PTT(partial thromboplastin time)가 가
7 8

통계 및 분석
Macintosh Statview version 4.5
Student's t-test
Chi-square test Fisher's exact
test . p 0.05

. 5 10

. 4 6

가 .

가

6 12

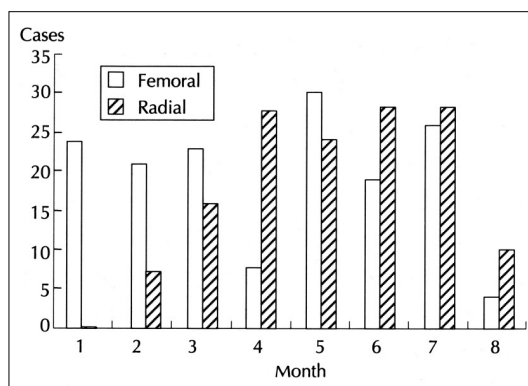


Fig. 1. Trend of transradial approach on monthly basis.

천자혈관에 대한 임상추적

(patency), (claudication)
Allen (re -
verse Allen test)(
10

가

)

30

0 3 4
0 가
, 1 가
, 2

Saito 7)

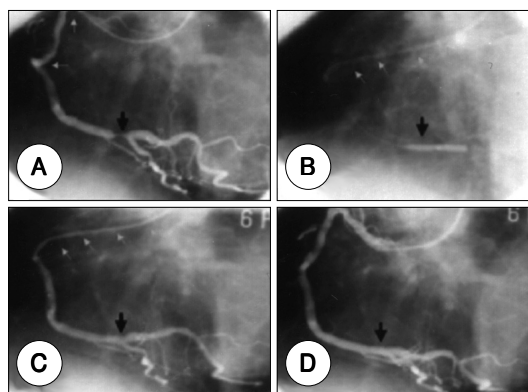


Fig. 2. Example of deep seating technique in 72 year-old male, previous failed PTCA patient. A : Right coronary angiogram by multipurpose guiding catheter showed proximal dual extreme angulation (small arrows) with 90% stenosis in distal right coronary artery. B : During the balloon inflation, 6Fr guiding catheter was gently inserted. C : With deep intubation, 3.5 x 16 mm NIR stent was inserted (arrow). D : After overdilatation with 4.0 x 9 mm Cubby balloon (arrow), guiding catheter was withdrawn.

결 과

2 4

(Fig. 1).

Table 1 and 2

92%(161/175)

89%

58%(101/175), 48%

(78/155) 10%

(12% vs 8%)

6.2 Fr

7.2 Fr (p<0.01).

(162 ml vs 202 ml, p<0.01)

(p = 0.14, Table 2 and 7).

유도도관의 선택

142

77%(80/103)가 Judkins left 3.5

가 , 96%(99/103)

Judkins Am -

platz 가 . 4

Voda, Extrabackup 가

Table 1. Baseline clinical characteristics

	R (n=142)	F (n=120)
Age (yr)	57.6 ± 10.4	58.1 ± 9.5
Sex (male/female)	116/26	77/33
Risk factor		
Hypertension	26 (18%)*	38 (32%)
Smoking	92 (65%)	73 (61%)
Diabetes mellitus	26 (18%)	24 (20%)
Cholesterol (> 220 mg%)	32 (23%)	28 (23%)
Diseased vessel : 1/2/3	92/44/5*	57/55/8
Clinical diagnosis		
Acute myocardial infarction	64 (45%)*	55 (36%)
Unstable angina	53 (37%)	74 (48%)

*p<0.01

73%

(55/75) Judkins left 4.0 가

87%(34/39)

가 5 multipu -

pose (Table 3).

85%(102/120) 7 Fr

Table 2. Angiographic & procedure characteristics

	Radial	Femoral
No. of procedure		
No. of lesions		
Lesion location		
LAD	95 (54%)	74 (48%)
LCx	31 (18%)	36 (23%)
RCA	49 (28%)	45 (29%)
AHA/ACC lesion type B2/C	115 (66%)*	120 (77%)
Type of intervention		
PTCA	64 (37%)	71 (46%)
Stent	101 (58%)*	78 (48%)
Rotablator	21 (12%)	13 (8%)
Primary PTCA (stent)	21 (19)	10 (6)
Size of sheath used (Fr)	6.2 ± 0.4*	7.2 ± 0.4
Amount of dye used (ml)	162 ± 70*	202 ± 84
Procedural success	161/175	137/155

*p<0.01

Table 3. Used guiding catheters

	R (n=142)	F (n=120)
Left coronary artery		
Judkins left 3.5	80	8
Judkins left 4.0	11	55
Judkins left 4.5, 5.0	0	4
Amplatz left (1,2,3)	8	6
Q curve	0	2
Voda 3	0	
Extrabackup	1	0
Right coronary artery		
Judkins right 4	18	30
Amplatz right (1,2)	10	4
Amplatz left (1,2)	6	4
Multipurpose	5	0
Sheath size		
6	112	1
7	29	102
8	1	17

78%(111/142) 6 Fr (Table 3).

관상동맥의 스텐트 삽입술

101

99 (98%).

1 가 8 Fr forcep

. 가 Gfx, NIR,

Jo . 7 (minimal lumen diameter, MLD)

11 (1.76 mm vs 2.82 mm, p<0.001),

. (bare stent) (diameter stenosis, %DS)

가 19 (- 0.9% vs 26%, p<0.001) (Table 5).

“ (acute gain)

(deep seating or deep intubation technique) ” 18 . (2.19 mm vs 1.06 mm, p<0.001) (Table 5).

(18%) (Table 4).

78 76 (

Table 4. Result of coronary stenting

Location	R (n=101)	F (n=78)
LAD/LCx/RCA	63/16/22	41/14/23
Stent type		
Gfx/Micro	34/ 3	14
NIR /Jo	30/18	31/24
Crossflex	14	7
Others (BE, JJ, Multilink, wall)	6	5
Multiple stent	7	5
Bare stent	19	26
Rota stent	11	8
Failed stent delivery	2	2
Deep seating technique	18*	2
Success rate	99/101 (98%)	76/78 (97%)

*p<0.05

Table 5. Angiographic results in transradial intervention

	Stent (n=99)	PTCA (n=76)	p value
RD pre	2.87 ± 0.59	2.60 ± 0.65	0.03
MLD pre	0.63 ± 0.08	0.71 ± 0.12	0.23
%DS pre	83 ± 13	79 ± 19	0.13
RD post	2.82 ± 0.50	2.50 ± 0.52	<0.001
MLD post	2.82 ± 0.51	1.76 ± 0.55	<0.001
%DS post	- 0.9 ± 16	26 ± 18	<0.001
Acute gain	2.19 ± 0.57	1.06 ± 0.48	<0.001

97%). Table 4

(18 vs 2) 7 8 Fr

요골동맥을 경유한 중재술의 정량적 관상동맥 측정의 비교(풍선성형술 및 스텐트 삽입술)

(minimal lumen diameter, MLD)

(1.76 mm vs 2.82 mm, p<0.001),

(diameter stenosis, %DS)

(- 0.9% vs 26%, p<0.001) (Table 5).

(acute gain)

.(2.19 mm vs 1.06 mm, p<0.001) (Table 5).

고속회전 죽상반제거술(Rotational atherectomy)

18 7 Fr

가 14 , 3 6 Fr, 1

8 Fr

13 10 7 Fr, 3 8 Fr

(52% vs 57%).

burr size 1.68 mm (burr/

artery ratio) 0.64 가 (Ta-

ble 6).

가

(10 : 7%),

Table 6. Data of rotational atherectomy

	R (n=21)	F (n=14)
Sheath size used		
6 Fr	3 (14%)	
7 Fr	16 (76%)	11 (79%)
8 Fr	1 (5%)	3 (21%)
Success rate	21/21 (100%)	13/14 (93%)
Mean burr size (mm)	1.68 ± 0.11	1.65 ± 0.16
Burr/artery ratio	0.64 ± 0.14	0.66 ± 0.13
No. of burr used	1.70 ± 0.42	1.46 ± 0.5
Rota stent	11 (52%)	8 (57%)
Restenotic lesion (stent)	11 (4)	3 (3)
Calcified lesion	3 (15%)	1 (7%)
Long lesion (>20)	12 (57%)	5 (39%)

가(CK-MB) 2) 3, 5
4
(14/18)
가 6, 9, 5
(Table 7).

요골동맥의 천자부위에 대한 임상 경과관찰

110 (77%) 가
2 89%(98) 3
8 (7%)
(2), 4 0 1
5
(Table 8).

Table 7. Causes of failure & complication

	R (n=142)	F (n=120)
Cause of failure		
Guidewire passage failure	10 (7%)	14 (12%)
Incomplete guiding backup	1 (1%)	1 (1%)
Balloon or stent passage failure	3 (2%)	2 (2%)
Rotablator burr passage failure	0	1 (1%)
Complication		
Death/CABG/Q wave MI	0	0
Enzyme elevation	3 (2%)	6 (5%)
Renal failure	5 (4%)	9 (8%)
Minor vascular complication	4 (3%)	5 (4%)

Table 8. Result : clinical follow-up of punctured radial arteries

Number of Patients	100 (77%)
Follow-up interval (days)	61 ± 25
Moderate local bruise before discharge	17 (16%)
Distal radial pulse	
0 - 1 grade	4 (3%)
2 grade	8 (7%)
3 grade	98 (89%)
Abnormal reverse allen test	5 (4%)
Hand claudication/AV fistula	0 (0%)
Any forearm discomfort	5 (2%)

고 안
1992
Kimeneij가
가 1)2)7-9)
가
,

1948 Radner¹⁰⁾
1989 Campeau¹⁾ 100
5 Fr
가
가
(heparin)

가 가
가 5
2
6 Fr
7 8 Fr
가
162 ml
202 ml 40 ml

경요골동맥 중재술시 적절한 유도도관 및 유도초의 선택

Kiemeneij¹⁾
Judkins Amplatz
8)
85%(70/82) Amplatz 가
90%
Judkins Amplatz

, Kimny¹¹⁾ Ochiai¹²⁾¹³⁾ 21% 8 Fr 가
 8 Fr가
 가 . Ochiai¹³⁾ .
 (MUTA : Multipurpose Use in
 Transradial Angioplasty or Ochiai catheter) 관상동맥 스텐트 삽입술
 99% 가
 가
 (hand crimped)
 “ deep seating technique(
 Judkins 3.5) ” . Schneider¹⁵⁾ ‘ Pink Power ’
 300
 Kiemeneij²⁾ .
 Voda Judkins , EI 가 가
 Gamal multipurpose (align -
 (backup) nment)
 가 , Wu⁸⁾ Am -
 platz type 2
 80%
 (stent migration) 가
 6 Fr
 kissing balloon
 (>3.5 mm)
 (intravascular ultra - ation) (stent migration or emboliz -
 Schneider¹⁵⁾ 2.3%
 sound) 7 8 Fr
 Yoon⁵⁾ 89 (predilatation)
 2.8 mm(2.9 mm,
 2.7 mm) Saito⁶⁾ profile
 3.1 ± 0.6 mm, 2.8 ± 0.6 mm, Fujita¹⁴⁾ extrasupport wire
 3.3 mm . Kimeneij³⁾
 Wu⁸⁾ 가 Saito (retri -
⁷⁾ 250 , eve)
 가 가
 7 Fr
 7 Fr 가 2
 72% , 40% 7 Fr (retrieve) 가
 가 , 42%, 가 가

	가	.
8 Fr	forcep	.
.		
	가	고속회전 죽상반제거술(Rotational atherectomy)
(premount)	(profile)	(burr size)
, 가	(bare)	가 1.75 mm 7 Fr, 2.0
		mm 8 Fr, 2.25 mm 9 Fr, 2.5
6 Fr	(0.064 inch)	mm 10 Fr .
	3.5 mm	7 Fr
	가	7 Fr
		35 7
	2	
3.5 mm premounted Crossflex stent		(burr to artery ratio)가 0.5 0.6
7 Fr		(conventional debulking method)
	가	가 0.75 0.8
6 Fr		(aggressive debulking method)
		STRATAS
응급 풍선성형술 또는 스텐트 삽입술시 요골동맥 사용의	가	가
가능성	20)	. 가
		가
	(direct PTCA or stent -	가
ing)		Fr 7 Fr
	가 . Steg 16)	가 가
	가	Kawamitsu 21)
		7 Fr 8 Fr
Mann 18)		
	21	.
2	10	
. ACCESS 19)		.
가		가
	가	가
	가	
		중재술후 혈관성 합병증
IABP(intraaortic balloon pumping)		

가

7 Fr . Saito 가

7) Doppler . 6 Fr (intravascular ultrasound) (He -

6.6% 7 8 Fr wlett Packard), (hemo -

73, 42% 가 dynamic monitoring) (source)

40, 21% , 가 가

RAID/SOD(ratio of radial artery inner diameter/she - ath outer diameter)가 1 가 .

(12.5% vs 3.3%).

가

3.4±0.6 mm, 3.0±0.4 mm

6 Fr 2.53 , 7 Fr가 2.85

6 Fr 가

14) (coronary intervention)

10% 가

3% ,

. Kiemneij 3)22) 3 5%

가

70% 가

가

대상 및 방법 :

1998 2 8 127 (142)

1998 1 8 103 (120)

58 가 181 가 49

91 , 118

, 15 . 5

요골동맥을 경유한 중재술의 문제점 2

. ACCESS 19) 4.6%, 2.3%

0.3% , 92%

가 (161/175) 89%

23) 58%(101/175), 48%(78/155)

가 가 . IABP(intra - 10% (12% vs 8%)

aortic balloon pump)가 6.2 Fr

7.2 Fr (p<0.01).

(162 ml vs 202 ml, 가

p<0.01) 2) 142

77%(80/103)가 Judkins left 3.5

가 , 96%(99/103)

Judkins Amplatz

가 . 87%(34

/39) 5 3)

101

99 (98%). 7

11

(bare stent)

가 19

“ (deep seating or deep intubation techni -

que) ” 18 (18%)

78 76 (97%)

2

4) 가

(10 vs 14),

5) 2

89%(98) 3

8 (7%) (2), 4

0 1

결 론 :

중심 단어 :

감사문

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