

외래에서 시행하는 심도자술 및 혈관조영술 : 안전성과 요골접근법에 의한 경험

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Outpatient Cardiac Catheterization and Angiography : Safety and Experience with Transradial Approach

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ABSTRACT

Background and Objectives : The safety and efficacy of outpatient cardiac catheterization was established. We evaluated our patient population and complications selected for outpatient procedures and our experience with transradial approach. **Materials and Methods :** A total of 346 outpatient cardiac catheterization (31% of all diagnostic procedures), performed with transradial approach, was compared with 788 inpatient diagnostic procedures in terms of patient population, clinical and angiographic features, complications of examinations. **Results :** 1) Indications of outpatient coronary angiography were as follows ; follow-up of coronary interventions or bypass surgery (41.6%), recent-onset or aggravated angina (31.2%), atypical chest pain (19.4%), stable angina (3.8%), recent myocardial infarction (2.9%), variant angina (0.9%), preoperative evaluation of valvular or congenital heart disease (0.3%). 2) Significant coronary lesions were found in 216 (62.5%) patients and left main disease in 12 (3.5%). Coronary spasm test, internal mammary artery or saphenous vein graft angiography, aorto-ileofemoral angiography, and bilateral carotid angiography were safely performed as indicated. 3) Success rate of examination by primary approach was 94.5%, similar to 94.9% of inpatients. Alternative brachial or femoral approaches were needed in 19 (5.5%) patients. 4) No death, cerebral thromboembolism or myocardial infarction were observed and one-day admission was required in 13 (3.7%) patients. Initial 254 patients (33%) showed good radial pulse (94%), weak or absent radial pulse (6%), abnormal reverse Allen test (6%) up to 61 ± 25 days. However, no claudication was observed. **Conclusion :** Cardiac catheterization and angiography was safely performed in the outpatient population selected using much extended inclusion criteria. Transradial approach is useful to set up outpatient procedures with

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less facilities and personnels and makes it available in the daytime with low readmission rate. **(Korean Circulation J 1999;29(10):1053-1062)**

KEY WORDS : Heart catheterization · Coronary angiography · Outpatients Radial artery · Complications.

서 론

Zimmerman ¹⁾ 1950

,

가

대상 및 방법

1970

80

1980

대상 환자의 선택

1997 11

1999 2

(road map)

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.

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(traditional setting)

2 - 20)

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SPE -

5 - 15)

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12)21)22)

Park Oh ²³⁾

가

가

가

(

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)

가 (5%,¹⁰⁾ 12%,⁹⁾ 15%²⁴⁾)

ST

가

25)26)

(

35%

)

가

(Allen test)

(,

27)

가

10

가

) , creatinine 가 2.0 mg/dl

가

verapamil morphine 가

6 F (guiding catheter)

(guidewire) Radiofocus (0.035" 150 cm, Terumo, Japan)

가 (fluoroscopy)

, PTFE coated GUIDE WIRE(with 3 mm "J" fixed core, 0.035" 145cm, USCI, USA)

가

6 creatinine

(subclavian or innominate artery)

1)

, 2) 가 (pushibility)

(multipurpose Judkins Amplatz)

, 3) 6 F

가 1

20 - (5 F, gauze Multipurpose, Judkins, Amplatz, Pigtail, USCI, USA)

요골동맥 천자, 관상동맥 또는 다른 혈관 조영술 및 관상 동맥 연축 유발검사

가

가

180 200

²⁸⁾ 20 gauge mmHg Judkins Left 3.5(5 F, USCI, USA)

5 6 French(F)

(12 cm, Cordis, USA DAIG, USA)

가

Amplatz Right, Amplatz Left(5 F, USCI, USA)

heparin 5,000 Unit, nitroglycerin 150 ug, verapamil 2.5 mg, 2% lidocaine methylergonovine maleate(Methergin)

40 mg 10 ml

(side arm)

. Lidocaine (burning sense)

(learning curve, 5)

mu -

Itipurpose (ENVISION soft tip MPA - 2 5F 110 cm, USCI, USA)

가 1.5 2

(Judkins, Amplatz, Pigtail)

. 5 10

결 과

대상환자의 임상적 특징 및 검사의 적응증

16

1134 346 (31%)

56.5 ± 9.8 58.0 ± 20.9

가

(78.6% vs. 67.9%, p = .000).

(40.2%),

(31.2%), (19.4%), (3.8%),

(2.9%),

(1.4%), (0.9%),

(0.3%) 127

(36.7%)

(40.2% vs. 5.6%, 36.7% vs. 12.7%, respectively).

	Outpatients (n = 346)	Inpatients (n = 788)	P value
Age (yr)	56.5 ± 9.8	58.0 ± 20.9	.111
Male	272(78.6%)	535(67.9%)	.000
Indications of coronary angiography			.000
Unstable angina	108(31.2%)*	273(34.6%)	
Acute or recent MI	10(2.9%)	184(23.4%)	
Stable angina	13(3.8%)	46(5.8%)	
Variant angina	3(0.9%)	14(1.8%)	
Atypical chest pain	67(19.4%)	216(27.4%)	
Valvular or congenital heart disease	1(0.3%)	5(0.6%)	
Follow-up of percutaneous coronary interventions	139(40.2%)	44(5.6%)	
Follow-up of CABG	5(1.4%)	6(0.8%)	
Previous MI	127(36.7%)	100(12.7%)	.000

vely),
(2.9% vs. 23.4%, 19.4% vs. 27.4%, respectively) (Table 1).

130 (37.6%) , 129
(37.3%) , 56 (16.2%) ,
19 (5.5%) ,
12 (3.5%) , 55.4 ±
5.7% .
(37.6%
vs. 29.6%).
(2.0%), (33.5%),
(1.7%), (1.
7%), (3.5%)
(Table 2).

346

Table 2. Angiographic results and additional examinations or interventions (n = 1134)

	Outpatients (n = 346)	Inpatients (n = 788)	p value
Angiographic diagnosis			.045
Normal or insignificant lesion	130(37.6%)	233(29.6%)	
1 vessel disease	129(37.3%)	301(38.2%)	
2 vessel disease	56(16.2%)	153(19.4%)	
3 vessel disease	19(5.5%)	69(8.8%)	
Left main disease	12(3.5%)	32(4.1%)	
LVEF (%)	55.4 ± 5.7	55.7 ± 6.1	.423
Additional examinations			
Left ventriculography	315(91.0%)	692(87.9%)	.245
Coronary spasm test	7(2.0%)	19(2.4%)	.831
IMA angiography	116(33.5%)	98(12.4%)	.000
SVG angiography	6(1.7%)	5(0.6%)	.101
Abdominal aorta, ileo-femoral angiography	6(1.7%)	17(2.2%)	.820
Bilateral carotid angiography	12(3.5%)	12(1.5%)	.044
One-stage coronary intervention	17(4.9%)	284(36.1%)	.000

Table 3. Procedural and post-procedural data of the study population (n = 1134)

	Outpatients (n = 346)	Inpatients (n = 788)	P value
Primary approach attempted			.000
Radial	346(100%)	453(57.5%)	
Brachial	0(0%)	8(1.0%)	
Femoral	0(0%)	327(41.5%)	
Successful examination by primary approach	327(94.5%)	748(94.9%)	.772
Alternative pproaches for failed primary approach			.082
Ipsilateral brachial	16(4.6%)	17(2.2%)	
Femoral	3(0.9%)	22(2.8%)	
Contralateral radial	0(0%)	1(0.1%)	
Major complications			
Death	0(0%)	0(0%)	-
Acute myocardial infarction	0(0%)	0(0%)	-
Thromboembolic events	0(0%)	0(0%)	-
One-day admission for observation	13(3.7%)	-	-
Distal radial pulse*			
0-1 grade	3(1%)		
2 grade	13(5%)		
3 grade	239(94%)		
Abnormal reverse Allen test	15(6%)		
Hand claudication	0(0%)		

* : Clinical follow-up was done systematically up to the period of 11-128 days (61 ± 25) for the initial 254 (33%) out of all 781 patients with transradial examinations. 0 grade; pulse not felt and artery collapsed, 1 grade; pulse not felt but artery not collapsed, 2 grade; reduced pulse compared to contralateral pulse, 3 grade; normal pulse, according to Saito's classification.

94.5% 94.9% . 가
19 (5.5%)
 , 13 (3.7%) (3 ;
 , 1 ;
 , 9 ;
) 1
(Table 3). 254
(33%) 11 128 (61±25)
239 (94%) 가 , 16
(6%) (13 , 5%) (3
 , 1%) , 15 (6%)
(claudication)

고찰

16 346 (31%)

심도자술 및 혈관조영술의 안전성

가

가

2)4)31)

가

외래에서 시행하는 심도자술

1968 Judkins³²⁾가 2 240 (40%)

, 1977

Schneider³³⁾ 54%

. Pepine³⁴⁾ 1990

“ 가

가 가 가

. 1979 13 7,553

Coronary Artery Surgery Study²⁹⁾ 10

0.2% 가 ”

50% , 1991

30% , , , ACC/AHA 2) 가

가

가 가

. Society for Cardiac , 가 (

Angiography³⁰⁾ 1979 1980

66 53,581 가 (

가), ,

(77%), 35% , ,

(12% ; 6.9%), ,

(2.8% ; 0.8%), (1. 5%) ,

. 32% NYHA Bersin

class , 16% class , 6% 19) 6 F

30% , 21% 30 49% . 0. 9% 1,001 0%, 0.3%,

1 , 33% 60 . 0.1%, 1% 가

. Lee 12) American Co -

. 1/4 , 3/4 llege of Physician ACC/AHA

986 50%

. 77% , 94%

, 0.9%

. Society for Cardiac Angio -

graphy 0.14% (22%), (15%),

(14%), (11%),

(9%) . Mahrer 8)

, 1 , 60 , 50%

, 30%

, NYHA class . 7 F 4,094

3,537 (86%) 가 . 가 5 6.6%
0.05% 가 . 가
(3,071 ,⁷⁾ 1,205¹¹⁾ 7-9)11)20) 가
83%, 75%
Block⁹⁾ 80% Block⁹⁾
20% 가 가 11.1% 5.2%가
Mahrer⁵⁾ 15%가
Elliott²⁰⁾
20) 가 가 Elliott
10 90% heparin nitroglycerin
1 가 32 (4.1%)
12 (3.5%)
가 , .
0%,
1 (0.3% ;
), 13 5%,¹⁰⁾ 12%,⁹⁾ 15%²⁴⁾ . Cla-
(3.7% ; 3 , rk²⁴⁾ 1
1 , 847 130 (15%)
9) (immediate PTCA)
(가 33%,
) 가 48%,
가 15%, 가
가 가 4%
65
가
16
(4.6%)
1
3 (0.9%)
가 , Klinker⁷⁾ 3,071
가 2,476 (79%)
1.1%
가 2.3%
. Simo³⁵⁾

13
digital subtraction angiography , ,
(regurgitant fraction) 가
가 가 가 .
가 ,
가가 가 . ,
연구의 제한점 5
10% 9)
가 .
가 가 (5%,¹⁰⁾ 12%,⁹⁾ 15%²⁴⁾)
가 .
Block 9) 1970 1980 가
28)29) (case 가
fatality rate) 0.2% 가
50% 가 350,000
가 , , ,
가 1% 2% 요 약
5,000
가 .¹²⁾ 연구배경 :
가 ,
, 5 F
가 .
5 6 F
(n=54)²⁸⁾
5 (2%) , 346 (31%)
³⁶⁾ 6 F 가
(n=142) 4 (3%) 788
7 F
(n=120) 5 (4%)
. 5 F
가 .
결 론 (40.2%),
(31.2%), (19.4%),
(3.8%), (2.9%),

(1.4%), (0.3%)

9%),

2) 216 (62.5%) ,

12 (3.5%)

(7 , 2.0%), (116 , 33.

5%), (6 , 1.7%),

(6 , 1.7%),

(12 , 3.5%)

3) 94.5% 94.9%

가 19 (5.5%)

4) , 13 (3.7%) (3 ;

, 1 ;

, 9 ;

) 1

254 (33%) 11

128 (61 ± 25) 239 (94%)

가 , 16 (6%) (13

, 5%) (3 , 1%) , 15 (6%)

(claudi -

cation)

결 론 :

중심 단어 :

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